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20 October 1961

HERALD OF COMMUNICATIONS

(VESTNIK SVYAZI)

No 1, 1958

- USSR -

Distributed by:

OFFICE OF TECHNICAL SERVICES
U. S. DEPARTMENT OF COMMERCE
WASHINGTON 25, D. C.

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HERALD OF COMMUNICATIONS

No. 1, 1958

[Following is a complete translation of Vestnik Svyazi (English version above), issue No. 1(214), January 1958. Both covers and the Table of Contents of this Russian language publication were included in the translation.]

NEW COMMUNICATIONS EQUIPMENT

A 150 kc-12 Mc FREQUENCY-RESPONSE METER

The instrument is designed for visual evaluation of the frequency response of long-distance coaxial links and television-channel equipment over the 150 kc-12 Mc band.

The frequency-amplitude characteristic of the device is flat to within +7% over the 1 to 12 Mc frequency range, and to within +5% over the 150 kc to 1 Mc range.

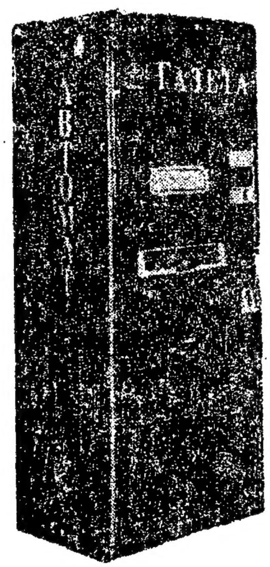
Power is supplied to the frequency-response meter from the 127- or 220-v AC mains.

The device takes the form of a cabinet that includes an oscilloscope unit, a FM oscillator unit with which an indicator unit is integrated, and two power-supply units. The units are mounted on pull-out chassis, with the controls located on the front panel.

The cabinet measures 1415 mm x 772 mm x 662 mm. It weighs about 170 kg.

AN AUTOMATIC NEWSPAPER VENDING MACHINE

The APG-1 automatic vending machine, developed by the Central Design Bureau of the Ministry of Communications of the USSR, is designed for the sale of newspapers costing 20 or 30 kopeks. It may be installed in the street (with no protective covering) or in buildings.

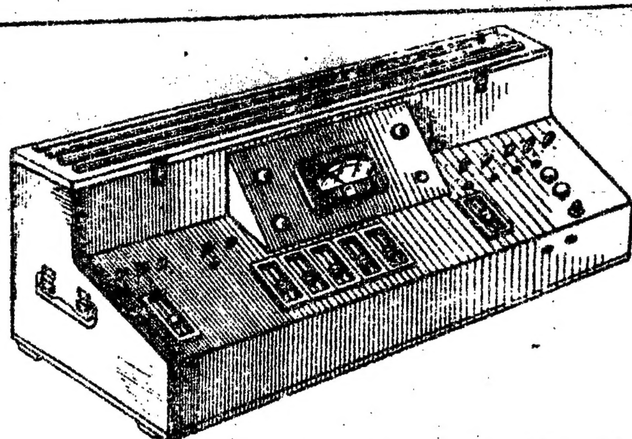


The machine will hold 1000 copies of a newspaper. The machine is actuated by a single-phase 0.4 kw motor (2700 rpm), drawing its power from the 220-v electric mains. The time required for delivery of a single newspaper from the moment that the money is deposited is 5 sec.

The machine dimensions are: height, 2000 mm, width, 876 mm, depth, 573 mm.

THE PTU-4 PORTABLE RELAY DEVICE

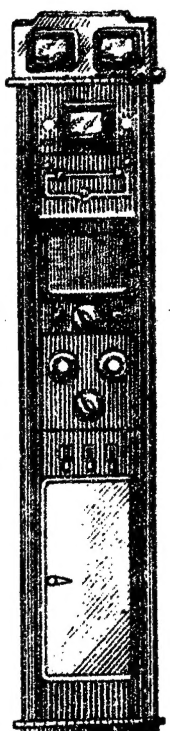
The PTU-4 device, developed at the Central Design Bureau of the Ministry of Communications of the USSR, will be used to transmit from theaters, clubs, concert halls, etc. not equipped with fixed relay installations. In addi-



tion, the PTU-4 may be utilized as studio equipment, and in
sound systems. The device is designed to handle five elec-
trodynamic microphones, as well as a single external pro-
gram source (tape recorder, phonograph pickup, relay line,
etc.). The PTU-4 output is designed to operate into two
trunk lines.

Power may be supplied to the PTU-4 from the 127- or
220-v AC mains, or from 6-v and 300-v batteries. The device
measures: 290 mm x 771 mm x 450 mm.

VSS 36/? REGULATED SELENIUM RECTIFIER*



*The original text pertaining to thi[s]
item is too mutilated to decipher.

Proletarians of the World, Unite!

HERALD OF COMMUNICATIONS

Monthly industrial-technical journal of the

USSR Ministry of Communications

No. 1 (214)

January 1958

(eighteenth year of publication)

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WE MUST BUILD MORE HOMES FOR COMMUNICATIONS WORKERS

The XX-th Congress of the CPSU outlined a huge program for development in all branches of the national economy and the construction program, and for raising the living standards of the Soviet people. One of the most important tasks in a socialistic country, where power belongs to the working class, is raising the material wellbeing of the people. The Communist Party and the Soviet Government have no higher aim than the welfare and happiness of the people. The Party and the Government are concerned constantly with improving living conditions for the workers. The Resolution of the CPSU Central Committee and the USSR Soviet of Ministers entitled "The Development of Housing Construction in the USSR" is a clear expression of this concern.

During the years of the five-year plans, especially in the post-War period, many apartment houses have been erected in our land. It is sufficient to say that for the period 1946-1956 alone, apartment houses with an over-all area of about 300,000,000 square meters were built in cities and workers' settlements, and that this is one and one-half times greater than all the municipal housing resources of pre-revolutionary Russia. During the same period about 5,700,000 homes were built by collective farmers and village intelligentsia. The over-all housing resources of municipal type homes in cities and settlements has increased, during the years of Soviet power, by a factor of 3.7.

The housing resources of communications enterprises have grown considerably. In the period 1951-1955 272,600,000 rubles were allocated from funds in the State plan, through the use of which 174,300 square meters of living space were put into use. In addition, during the same period, individual builders, with the aid of State credit, built themselves homes whose living space amounted to 76,000 square meters; out of this construction, about 25,000 square meters were built in 1956.

During 1957, only using funds provided for in the State plan, communications enterprises allocated more than 110,000,000 rubles for housing construction and put into use more than sixty thousand square meters of living space. The over-all living

space of houses constructed in 1957 by communications workers and individual builders exceeded 30,000 square meters.

The problem of living quarters, however, continues to be one of the most acute matters facing communications workers. This problem is the result of serious shortcomings which are still found in housing construction carried out by the USSR Ministry of Communications, the Ministry of Communications of the union republics and communications enterprises; these agencies are far from utilizing fully the facilities set aside for housing construction by the State, and in a number of instances, are not fulfilling their plan for putting living space into use.

Communications enterprises and construction organizations are developing construction slowly, and as a rule, are delaying the occupancy of apartment houses for the IV-th quarter of 1957. Thus, the Ukrainian and Turkmen SSR Ministries of Communications did not fulfill their plans, during the first half of 1957, for having living quarters occupied. The RSFSR Ministry of Communications did not attain the occupancy of five apartment houses with an overall area of 2,000 square meters. The Trust "Radiostroy" (Trust for the Design, Planning and Construction of Radio Stations) organized unsatisfactorily their work in building a housing settlement for communications workers in Moscow (the Director of the Trust, Comrade Aylamaz'yan, the construction Supervisor Comrade Voytenko).

The republic communications ministries are allowing dissipation of resources on numerous objectives, and are not concentrating available resources and working strength on already-begun jobs. Thus, according to the Kiev SMU (Construction and Installation Administration) of the USSR Ministry of Communications, 450 workers were assigned to 16 sections, whereas only 130-140 men were working on already-begun housing construction jobs. The Ukrainian Ministry of Communications is not doing sufficient planning for providing facilities to projects already underway. For example, 800,000 rubles were not enough to complete the construction of a dormitory for letter carriers in the city of Kiev; the same was true of 1,000,000 rubles for a dormitory in Bykovo and 500,000 rubles for an apartment house in Cherkassy. Similar examples may be drawn in the communications ministries of other union republics.

The delay in the construction of apartment houses is unexcusable. In 1951 construction was begun on a 25-apartment house in Komsomol'-on-Amur, in 1952 on a 24-apart house in Novosibir, and in 1953 on apartment houses in Smolensk, Saratov, Rostov-on-Don, Yakutsk, and on dormitories

for the communications-technical school in Rostov-on-Don.

As before, there is unwarranted tearing down of apartment houses for the purpose of clearing space for erec ing buildings in cities; this leads to loss of living space there are excesses tolerated in designing and construction projects, leading to a rise in the cost of production.

Waste in work has still not been eliminated, and imperfections are being gotten rid of intolerably slowly; this lowers the over-all quality of apartment houses and delays the occupancy dates, as well as arouses the justified complaints of those who are waiting to move in. In seven months, imperfections in the construction of a dormitory for a communications-technical school in Kiev, which were tolerated by the Kiev SMU of the Ministry of Communica tions, have not been eliminated; as a result of this, during the first half of 1957, the plan for occupancy of 2,150 square meters of living space was defeated. Teachers from the communications institute in Tashkent moved into houses which had considerable imperfections (Director of the board of the construction enterprise, Comrade Korf).

In addition to funds from the State plan, large sup plementary means from other financial sources are being put into housing construction for communications workers. The control of housing construction, however, which is exercise above the State plan and organized in the republic communic tions ministries and the regional administrations, is completely unsatisfactory. The independent communications ministries (among them the RSFSR Ministry of Communications) do not even know the amounts of funds put into housing construction or from which sources they come. In addition, man agers of enterprises and independent building organizations having laid full responsibility for housing construction on organizations working by contract, often do not concern themselves with seeking out reserves and additional opportunities for speeding up construction work.

The popular construction method, which was started in Gor'kiy and adopted in other cities, is not being utilized enough in housing construction for communications workers, although it is completely evident that the number participation of workers and employees from communications enterprises and organizations will help to raise the volume of housing construction, move up occupancy dates, and cut costs. Testifying to this is the experience of the Ukrainian, Belorussian, and Kazakh SSR communications enterpri es and organizations, as well as such organizations as the State All-Union Trust for Building Structures of Intercity Wire Communications (a house in Koptev), and the Main Administration of the Long-Distance Telephone-Telegraph Ex-

change (a house on the Khoroshevskiy Highway), the Technica Radio Control Center (houses in the Butovo Settlement) and others.

Independent builders do not receive sufficient aid from Party and Trade-Union organizations in places which are often not under housing construction management.

The Central Committee of the CPSS and the Union Soviet of Ministers of the SSR set as a task for the next 10 or 12 years the elimination of the housing shortage and outlined a number of practical measures for a future rise in work rates, and an improvement in the quality as well as a lowering in the cost of construction. Enterprise and organization supervisors, in order to acquire supplementary capital investments for housing construction, have been given the right to integrate the funds assigned to planned housing construction with the special funds at the disposal of credit and industrial organizations; these funds must be used for putting major projects not included in the plan into order. In addition, supplementary sources for financing housing construction were indicated.

The Party and the Government have given local deput Soviets and national economy Soviets the obligation of rend ering practical aid to organizations and enterprises carrying out housing construction. A number of measures have bee outlined designed to regulate the designing and material-technical supplement of housing construction.

N.D. Psurtsev, USSR Communications Minister, in order to further a considerable increase in the volume of housing construction in the communications system, improvement in construction organization and work rates, as well as financial development for housing construction which is being carried out with the labor participation of workers, engineers and employees of communications enterprises and organizations, granted the communications ministers of the union republics and the supervisors of district communications administrations, communications enterprises and organizations, the right to put the following supplementary funds into financing of housing construction in the 1957-1960 period: first, to utilize for this purpose, with the agreement of trade-union organizations, up to 70% of the money acquired as a prize for fulfilling the revenue plan of subscribers' payments for radio receivers and televison sets. Also used will be the prizes received from organizations of the State Committee on Radio and Television Broadcasting attached to the USSR Soviet of Ministers for the achievement of improved standards of broadcasting operation by radio stations. In addition, industrial communications enterprises and economic organizations have been allowed to

make expenditures above the sums transferred to the fund of the enterprise (of the Supervisor); this would mean up to 30% of the over-all above-plan profits of the enterprise.

The ministers of the union republics, with the permission of the Soviet of Ministers of the republic, should also put the funds received as a result of dismantling buildings and installations which have fallen into disrepair into supplementary capital investments for housing construction. A correct and full utilization of all these supplementary capital investments will make possible the quicker eliminaton of the housing shortage.

In order to broaden the material base for housing construction, the Government allowed the allocation of funds to enterprises for buying their own lumber. The USSR Minister of Communications allowed the utilization of lumber acquired from lines of untreated poles for the construction of repair shacks, and also made possible the transferal of individual builders to this work. It was made possible to utilize materials saved in planned construction against budget requirements, as well as extra materials which are subject to sale for housing construction which is being carried out through facilities beyond those already being used.

All this will create new possibilities for the wide development of housing for communications workers. But with this there is still a need for better organization of work. It is necessary to eliminate more quickly the miscalculations which are found in the organization of housing construction within the system of the communications ministry. Builders are in need of greater aid from ministry and enterprise supervisors. We must study more carefully the possibilities for using local construction materials and production dropouts in housing construction, in particular, industrial and boiler slag, ashes from power plant furnaces, as well as such cheap materials as reeds, local stone, and silicates. It is time for more daring adoption of collapsable factory-built structures, large-panel structures and simplified brick laying, drawing the production enterprises of local Councils of national economy into this work.

The Central Committee of the CPSS and the Union Soviet of Ministers of the SSR, devoting special attention to the fulfillment of the housing construction plan, set up a system in which prizes for the fulfillment of the construction-repair work plan will only be paid if the construction organization achieves the occupancy plan for living space. This raises the responsibility of builders in fulfilling the housing construction plans on time.

All measures mentioned above are aimed at a sharp increase in the volume of housing

construction. All resources, however, that can be utilized for raising construction rates have not been used up. We must seek out and utilize newer and newer resources, keeping in mind that the future development on housing construction, having a national importance, is one of the most important tasks of all Party, Soviet and trade-union organizations, as well as of the Soviet people.

OUR EXPERIENCE IN THE CONSTRUCTION OF
RESIDENTIAL HOMES IN KRASNODAR KRAY

During the past three years (1955-1957) the communications workers of Krasnodar Kray have done a lot of work in the area of building residential homes. They built and made available 27 residential homes with a total of 4800 m^2 of living space. More than 2000 m^2 of new living space has been made available in the districts of the territory.

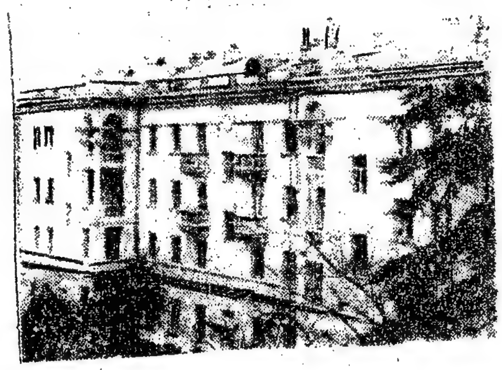
In 1956, in those districts located along the Black Sea, five 8-apartment two-story brick buildings were built to satisfy the housing needs of communications workers; these buildings were built with a view toward economy, and for the construction of the second floor of each of these buildings, wooden prefabricated-construction 4-apartment houses were used. The territorial administration initially acquired two prefabricated houses through funds allocated by the Ministry of Communications; three houses were made available to us locally from the lumber mill of the "Krasnodarles" combine.

Our decision not to set up 4-apartment prefabricated houses, but rather to build 8-apartment brick homes, and using these prefabricated houses for the second floors of the buildings proved to be correct; we were able to reduce the time required for construction, to reduce the cost of construction, and we were able to make twice as much living space available. All construction materials were prepared by communications workers at the construction site. Managers from a number of communications offices (Comrade Danilkin, the supervisor of the Lazarev Communications Office, and others) demonstrated their initiative in the manner in which they organized the projects, and this also tended to speed up construction work. A period of from 3 to 6 months was spent on the construction of each house.

In 1956, a 24-apartment house, with all conveniences, was built for the communications workers in the city of Sochi, i.e., for the engineers, technicians, and general-skill workers.

In Krasnodar last year a 16-apartment house was made available. There is a dormitory on the first floor of this house, and 25 young specialists live here; these specialists graduated communications technical schools and were assigned to jobs in Krasnodar; the remaining three floors have been divided into apartments; these apartments were assigned to 15 families of communications workers. The construction of this building was begun in 1955. No provision was made in the initial plan for the installation of

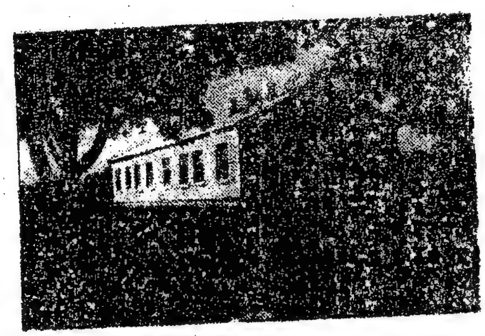
A 16-apartment residential home in the city of Krasnodar, built in 1957.



A 24-apartment house, built in the city of Sochi in 1956.

gas-heating facilities and gas heaters for bathrooms. Following the example set by the communications workers in the city of Gor'kiy, our communications workers — the future residents of this house — actively participated in the construction. This speeded up the work, and what is most important, produced savings in funds so that it became possible to equip the entire house with gas-heating facilities, and to set up a laundry, a kitchen, and a bathroom in the dormitory.

An 8-apartment residential house for the workers at the Radio Center; this building was built in the city of Sochi in 1957.



A 4-apartment house, built in 1957 by the collective of the Krasnodar DRTS (Wire-Broadcast Network Administration).

Following the method used by the communications workers in the city of Gor'kiy, last year, in Krasnodar, funds from the supervisor's allocations, excess profits, and internal reserves were used for the construction of six 4-apartment houses, one 8-apartment, and one 2-apartment houses. The workers engaged in the extension of wire-broadcast facilities, telegraph operators, and telephone operators participated in the construction of these houses, and this speeded up the project as well as reduced its cost by 40%.

On the basis of the experience gained by the communications workers in Krasnodar, the communications workers in the districts of the territory also started the construction of small residential homes through their own efforts. For example, in Armavir the communications workers built a 2-apartment house, and in Tuapse they started the construction of a 6-apartment house; in Sochi, the construction of a 4-apartment house was undertaken. The construction of residential homes is also going on in other localities.

The collectives of the line-servicing centers in the territory are also doing a lot of work in this regard. In 1957, the linemen, through their own efforts, built seven homes for repairmen, providing a total living area of 404 m^2.

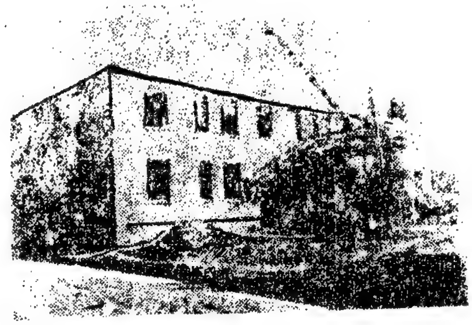
In Sochi, an 8-apartment house was built for the workers at the Radio Center. Since the prospective residents of the new house also participated in the construction, this house was made available ahead of schedule. All workers at the Radio Center were provided with apartments and all conveniences.

As a result, during 1957 alone, in the Krasnodar Kray approximately 3000 m^2 of living space was built and made available for communications workers. More than 80 families of communications workers received apartments.

It should be pointed out that some of the production space that has been released by communications enterprises is being used to improve living conditions; for example, this is the case in Sochi, Novorossiysk, Armavir, and other populated areas. In the House of Communications in Novorossiysk, as a result of the proper distribution of production space, one wing of the building was released for living quarters. Eight families of communications workers settled here.

The collective of communications workers in our territory, having started the practical implementation of the Resolutions of the CC CPSU and the USSR Council of Ministers, resolutions pertaining to the expansion and inten-

An 8-apartment house built in 1956 in the city of Gelendzhik.



An 8-apartment residential house, under construction by the collective of the Krasnodar ATS (Automatic Telephone Exchange).

sification of residential construction, are devoting all of their efforts in order to provide residential houses for all communications workers requiring such facilities, and these homes are to be made available prior to 1960; these efforts are concentrated primarily in Krasnodar, Novorossiysk, Armavir, Sochi, and Maykop.

M.F. TARASOV, The Director of the Krasnodar Territorial Communications Administration

A CROSSBAR TELEPHONE BRANCH OFFICE WITH A CAPACITY OF 100 NUMBERS

***

The following are discussed: the schematic diagram, operating principle, performance data, and structural design of a crossbar branch office with a capacity of 100 numbers. The circuit-designing and planning of this branch office were executed by the collective of workers at the Scientific-Research Institute of urban and rural telephone communications of the USSR Ministry of Communications, the Laboratory for the study of the scientific problems of wire communications of the USSR Academy of Sciences, and the "Krasnaya zarya" Plant. An experimental model of this branch office, which was produced by the "Krasnaya zarya" Plant, is now being used experimentally in the Leningrad city telephone system.

***

General Information

The telephone branch office, which has been designated PS MKS-100, and which operates on multiple crossbar MKS connectors, was designed to be installed in apartment houses and is intended to serve home telephones. It was designed to operate jointly with the district (city) automatic dial office (ATS) based on the ten-step system. To the branch office may be connected ten outgoing two-wire trunk lines and ten incoming trunk lines, of the ten incoming lines, eight two-wire lines are used to make local (i.e intracity) connections and two three-wire lines for the purpose of making only long-distance connections. No provision is made for routing the telephone traffic within the branch office.

The basic diagram of the branch office and the method of connecting it to the district ATS are shown in Fig. 1. As is evident from this diagram, the outgoing trunk lines of the branch office terminate at the district ATS at the RSL units, which are connected to the input of the I-IIGI. The multiple jack field I-IIGI is connected in parallel to the multiple IGI of the ATS. The incoming link to the subscribers of the branch office is effected via the RSL units, which are connected to the field of the last

group-selector stage. The switching of the calls at the branch office is done by the RPM telephonic relays and by multiple MKS* crossbar connectors.

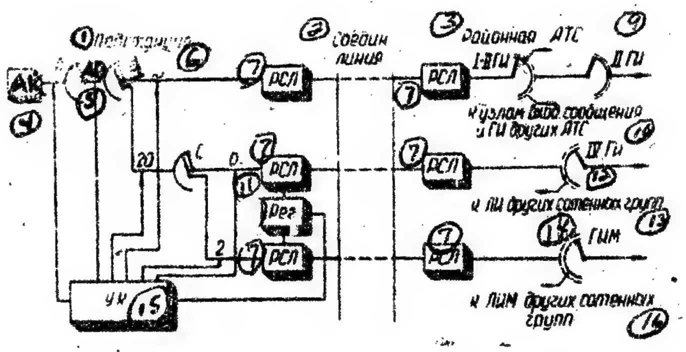


Fig. 1. 1) Branch office; 2) trunk line; 3) district ATS; 4) AK; 5) AD; 6) d; 7) RSL; 8) I-IIGI; 9) IIGI; 10) to the units of the incoming call and the GI of other ATS; 11) Reg 12) IVGI; 13) to the line selectors (LI) of 100-unit groups 14) GIM; 15) UK; 16) to the LIM of other 100-unit groups.

The MKS connector (Fig. 2) consists of ten vertical units, each one consisting of ten outlets, and can be considered as ten 10-line selectors. In the block-diagram, the multiple crossbar connectors are shown, for greater clarity in the form of selectors A, B, and C, with a single movemen of the brushes. The design of the MKS connectors is not suited for making free or forced selection, and therefore their operation is controlled by a relay-control unit UK. Only one of these units is installed at the branch office; this unit serves as both an outgoing as well as an incoming connection.

*The design and operating principle of multiple crossbar connectors are discussed in the article by V.N. Roginskiy entitled "ATS with Crossbar Connectors" ("Herald of Communications," No. 9, 1956).

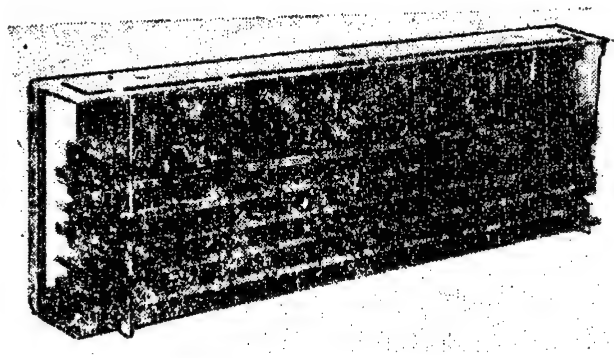


Fig. 2.

The Sequence Followed by the Branch-Office Instruments in the Process of Making a Connection

Outgoing calls. When a subscriber calls an office, a line relay in the subscriber unit AK begins to operate, and the control unit UK starts to operate. The latter determines the position of the line of the subscriber making the call in the field of the MKS connector of the link A, and the free outgoing trunk line available for the subscrib[er] in question, which has been connected to the input of the MKS connector of the link V. Having established the require[d] connection with the outgoing RSL unit, the control unit UK is switched off in order to handle other calls.

When the RSL unit of the branch office is busy, the RSL unit of the district ATS is also busy, in which case the telephone of the calling subscriber receives a busy, "ATS answer" signal. Upon hearing this signal, the subscri[ber] dials the number of the subscriber being called. The dial pulses are received by the RSL unit of the district ATS, are corrected, and are then transmitted to the instruments of the corresponding selector stages. The connection is subsequently set up in the ordinary manner.

Incoming calls. If an incoming connection is made to a subscriber of the branch office, then, via the corresponding 10-step level in the field of the last group-selector stage (IVGI), the RSL of the district ATS and the R[SL] unit of the branch office are engaged, following which the register Reg. is connected to the latter; this then receive[s] the last two numbers of the dialed number. These numbers, as noted by the registers, are transmitted to the control

unit UK, which finds a free route from the busy RSL unit to the line of the subscriber being called through the MKS connectors of the links A, B, and C.

Once it has determined the free channels, the UK unit makes the necessary connection; after which, it is released, together with the register, to handle other calls. The line of the subscriber being called is tested in the incoming RSL unit, and the result of the test is transmitted to the RSL unit of the district ATS.

If the line of the subscriber being called is busy, then the subscriber making the call will hear a "busy" signal, transmitted by the RSL unit of the district ATS. In this case, the apparatus of the branch office is disengaged, and the trunk line assumes the busy signal. If the line being called is free, then, from the RSL of the district ATS, are sent the first and follow-up signals of the ringing (magneto) current; then, at the same time, a buzzer sounds in the telephone of the subscriber making the call to indicate a "call-signal check." As soon as the subscriber being called replies, the buzzer and magneto currents are cut off, and the conversational circuit is set up.

The ringoff system. The release of subscriber lines and the branch-office equipment is done through first-party ringoff. In this case, from the corresponding RSL unit of the district ATS a "busy" buzzer signal is sent to subscribers who are not using handsets. When necessary, it is possible to shift from first-party release to last-party ringoff, by pressing a button in the RSL units installed at the district ATS.

Connections with an long-distance telephone exchange. The making of an incoming long-distance call is done by establishing, in similar fashion, a local incoming connection. The difference consists merely in the fact that it is possible for the operator at a long-distance exchange telephone exchange to make a connection with a subscriber line that is occupied by a local connection, by forcibly disconnecting the telephones of the parties in conversation and by buzzing repeatedly. The disengaging of the apparatus involved in a long-distance call is controlled entirely by the telephone operator of the long-distance exchange.

Operational Data

The power supply for the telephone transmitters of the branch-office subscribers, as well as the transmission of buzzer and magneto (ringing) currents, are insured by the RSL units installed at the district ATS. In order to feed the electromagnets of all MKS connectors and the control relays, a current with a voltage of 60 v is used, which

is obtained from a rectifier of the VP-61/4 type. This solution made it possible to dispense with the use of a storage battery at the branch office, and reduce the demands made on the rectifier.

The total maximum resistance of the loop between the subscriber's and the trunk lines amounts to 1,500 ohms, while the resistance of the loop of the subscriber's line should not exceed 700 ohms.

In the event of a nonproductive tie-up of the apparatus (equipment busied without dialing, a fault in the subscriber lines, etc.) provision has been made for their forcible disconnection. In this case, the subscriber making the call receives a buzzing (busy) signal from his subscriber unit, and the line of this subscriber is blocked. This blocking of the subscriber's line is automatically terminated after the fault is eliminated or the subscriber rings off.

When breakdowns occur at the branch office, special signals are transmitted to the district ATS. Provision has been made for remote checking of the operation of subscriber units and of the branch-office equipment. This check is made by means of the AUD apparatus of the district ATS; this permits the measuring of subscriber lines from the test-measuring distributing-frame board.

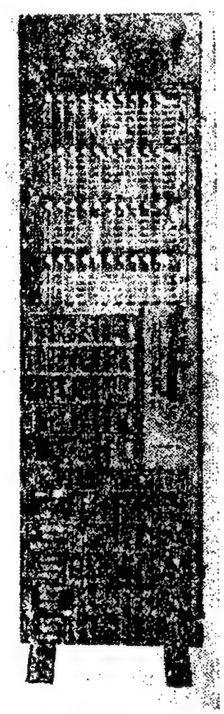


Fig. 3.

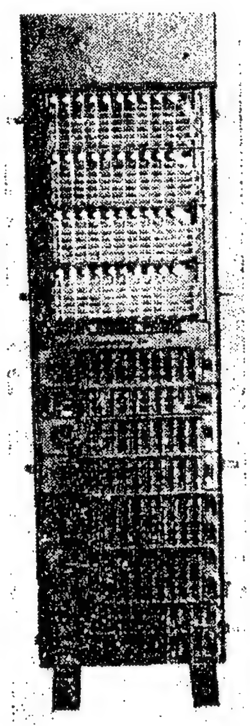


Fig. 4.

If the supply of alternating current to the rectifier of the branch office is terminated, then a signal is transmitted to the district ATS to indicate a breakdown, and then ten subscriber lines of the branch office are connected to the outgoing trunk lines, as a result of which, the possibility of making an outgoing connection is retained

Structural Design

The basic equipment of the branch office is composed of two outdoor-type racks (Figs. 3 and 4) 2,235 mm x 690 mm x 460 mm in size. For protection against dust and mechanical damage, each rack, on both its front and wide sides, has a cover with a rubber seal. These covers are equipped with hinges and can be turned 180°; this permits free access to the instruments.

The crossbar branch office, which is being used experimentally at the Leningrad city telephone exchange (GTS), occupies an area of 5.1 m^2 (1.7 m x 3 m).

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CONNECTING TELETYPEWRITER STATIONS INTO A TELETYPE NETWORK

* * *

The article gives a brief description of methods for connecting teletypewriter stations to manual TWX offices in order to set up direct interconnection of these stations. The author discusses the operating cycle of the calling relays, which excludes the possibility of accidental calling in cases where the teletypewriter stations operate over wires or over telephone circuits (through line-transformer center taps).

* * *

The telegraph network of the USSR, in addition to utilizing automatic retransmission of through telegrams is at present employing a system of direct connections between terminal telegraph points for the direct transmission of telegrams from the point of transmission to the final destination. This system eliminates the need for processing of telegrams at tandem offices, which explains the economies resulting upon introduction of the system.

In order to take fullest advantage of a direct-connection system, a far-flung system of voice-frequency telegraph channels (TT channels) is needed. Even with a limited system of TT channels, however, the effectiveness of employing a direct-connection system is quite obvious. This is especially true of intraoblast (intraregional) telegraph links, where the direct-connection network is set up using, in addition to TT channels, telegraph wires and phantom lines operating through line-transformer center taps, as well as combination trunk lines consisting of TT channels and wires.

If teletype stations are connected directly over telegraph wires and combination lines, it is desirable to connect such stations into manual TWX offices. The reason for this is that these offices may be more readily modified for accepting terminal telegraph stations over either TT channels, wires, or over combination lines.

Below we discuss the changes which must be made in the circuit of manual TWX offices so that teletypewriter stations operating over single-wire and combination-line circuits may be connected into the offices.

Single-Wire Connection of a Teletypewriter Station

In order to connect a teletypewriter station into the switchboard of a direct-connection center using a

single-wire system, it is only necessary to change the circuit of the subscriber panel installed at the TWX office. Figure 1 shows the modified subscriber-panel circuit.

When the calling button on the calling device of the teletypewriter station is pushed, relay C of the subscriber panel operates, owing to the current that flows through the circuit:

—LB, lamp SL_2, winding I of relay C, contact t_1, resistor W_8, the line L, the calling device of the teletypewriter station, ground.

When contact c_1 closes, the armature of relay R is pulled up:

—MB, 0.9 kohm resistor, winding I of relay R, contact c_1, ground.

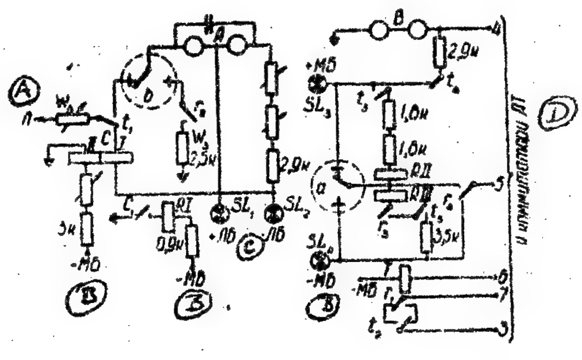

Fig. 1. A) L; B) MB; C) LB; D) to TWX switchboard.

A signal lamp lights at the switchboard, indicating that the teletypewriter station has called the TWX office.

Seeing the calling signal, the TWX operator plugs into the appropriate jack. When this is done, relay T operates on the subscriber panel. The switching contact group t_1 of this relay reverses the polarity of the power-supply circuit for the subscriber device at the teletypewriter station; as a result, the telegraph instrument is connected into the line at the teletypewriter station, and its motor is started.

Relay C, which has been added to the circuit, is mounted at an open spot on the subscriber panel near the other telephone relays. Its function is to prevent possible "false calling" owing to a decrease in conductor insulation.

The occurrence of false calling is explained by the fact that winding I of the calling relay R is always connected to the line, and if a leakage current of any great magnitude flows through the line, the relay will operate. As a rule, in order to avoid operation of the relay owing to leakage currents, the mechanical loading on the armature is increased. This measure, however, leads to disturbance of normal operation of the relay.

The essence of the method used in this circuit to prevent false calling consists in the fact that the auxiliary relay C, rather than the calling relay, is always connected into the line. The second winding of this relay (winding II) is a balancing winding. Its ampere turns act in a direction opposite to the action of the ampere turns of winding I. It is clear that if windings I and II of the auxiliary relay have the same number of turns, and the current in winding II equals the leakage current flowing through winding I, the possibility of false operation of relay C is excluded.

As is known, leakage currents cause a deterioration in conditions along the telegraph-signal path between terminal stations. In order to eliminate this effect, an appropriate value must be chosen for the current flowing through the local winding of relay A on the subscriber panel. In order to do this, a milliammeter is connected into the armature ("reed") circuit of relay A. Then, a string of "T"'s is sent from the terminal station, and the angle α_1 through which the milliammeter needle deflects with respect to scale zero is determined. Next, in the same way, the angle of deflection α_2 is determined during transmission of a continuous string of "G"'s from the terminal station. The criterion indicating correct choice of the magnitude of the current in the local winding is equality of the absolute values of angles α_1 and α_2, and their symmetry around scale zero of the milliammeter. Experience has shown that if the magnitude of the current in the local winding of relay A is properly chosen, the link will operate more stably through the TWX office than is the case with standard simplex telegraphy. In the first case, the higher stability of the link is explained by the division of the reception and transmission circuits at the TWX office.

Figure 2 shows the arrangement of the jumpers or the distribution frame of the subscriber panel when the latter is utilized for a single-wire-system teletypewriter station. The following changes are made in the panel circuit in addition to the changes in the jumpers. The circuit wires connected to winding I of relay R are resoldered

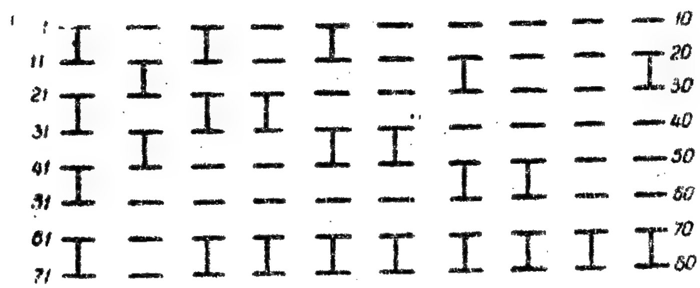

Fig. 2

to winding I of relay C. Negative local-battery voltage is applied to winding I of relay R, and grounded through contact c_1. Positive and negative line-battery voltage is applied to resistance lamps SL_1 and SL_2, respectively, and positive and negative local-battery voltage to lamps SL_3 and SL_4. In choosing the line-battery voltage, the distance separating the TWX office and the teletypewriter station is taken into account. Resistor W_3, rather than the negative side of the line battery, is grounded.

Connecting a Teletypewriter Station in Over a Combination Line

A block diagram illustrating the connection of a teletypewriter station to a TWX office over a combination line (TT channel-wire) is shown in Fig. 3. As this diagram

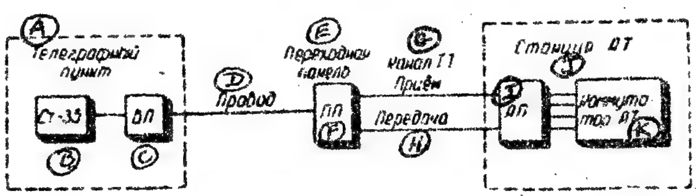

Fig. 3. A) Teletypewriter station; B) ST-35; C) VP; D) wire; E) adaptor panel; F) PP; G) TT channel, receiving; H) transmitting; I) AP; J) TWX office; K) TWX switchboard.

shows, the equipment at the teletypewriter station consist of a ST-35 instrument, and a calling device VP. An adapter

panel PP is installed where the conductor joins the TT channel. At the TWX office, the TT channel terminates in a standard subscriber panel, AP.

Figure 4 shows the basic circuit of the PP panel. When the calling button is pushed at the teletypewriter-station calling device, the calling relay on panel PP operates, as a result of the current flowing through the circuit:

–LB, lamp SL_2, winding I of relay R, contact t_1, resistor W_8, the line L, the teletypewriter-station calling device, ground.

When relay R operates at the TWX office, ringing takes place over the circuit:

–MB, lamp SL_4, contact r_2, TT channel (transmit), TWX office.

The calling lamp lights on the TWX switchboard.

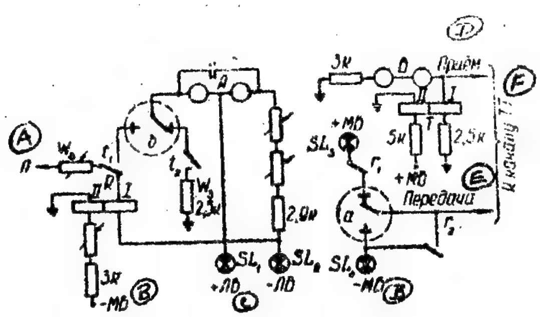

Fig. 4. A) L; B) MB; C) LB; D) receive; E) transmit; F) to TT channel.

Until the operator plugs into the jack corresponding to the line over which the call has been made, relay T on the PP panel will be inoperative. The reason for this is that the current in local winding II of relay T, and in its line winding I flow in opposite directions.

When the plug is inserted at the TWX switchboard, the direction of the current in winding I of relay T reverses, and relay T operates. When this happens, contact t_1 reverses the polarity of the power-supply circuit to the teletypewriter station (turning on the telegraph instrument). Simultaneously, the armature of calling relay R on the PP panel is released.

There is no need for an auxiliary relay to guard against false calls at the PP panel. Instead, winding II of relay R is used.

The wiring of the PP panel is substantially different from that of standard subscriber panels. Therefore it is not possible to obtain a PP-panel circuit by changing the jumpers on the distribution frame of an AP panel. For this reason, it is desirable to use completely new wiring in a PP panel, utilizing the chassis and some of the parts from a standard subscriber panel.

If panels from SORS racks are available at an intermediate telegraph office, and they are connected according to the two-wire system, their circuit may easily be altered to a PP panel circuit; in doing this, it is necessary to install additional telephone relays on the panels, connected as shown in Fig. 4.

It is quite evident that the circuit we have just described for a subscriber panel to be used to connect a teletypewriter office into a TWX switchboard over a single-wire line, as well as the circuit for the PP adaptor panel, may also be used in connecting up standard teletypewriter installations.

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ATTENDANT"S PLACE FOR SERVICING RADIO COMMUNICATIONS CHANNELS

An attendant's place for servicing radio communications channels, developed by the Moscow Board of Radio Communications and Radio Broadcasting, is described.

At the beginning of 1956, at the Radio Bureau of the Moscow Board of Radio Communications and Radio Broadcasting (MDRSV), there was adopted a new attendant's place for servicing radio communications channels (ORK), developed in accordance with the efficiency suggestion of a complex team consisting of S. P. Borisovskiy, A. M. Potashnikov, L. N. Khavskiy and A. F. Shuvalov.

The adoption of an ORK equipment set changed the previously existing work technology in the Radio Bureau which resulted in considerable improvement in the quality of servicing radio channels, higher labor productivity and higher work effectiveness of the personnel on duty.

An essential feature of the ORK attendant's place is that it combines all the functions for servicing radio communications: 1) switching and preparing radio communicatioms channels for operation; 2) monitoring the operation of transmitting and receiving channels and of the radio communications line as a whole; 3) conducting service calls with correspondents. All these functions are performed independently of the switchboard position for telegraph traffic.

The relation between the technician on duty and the telegraph personnel on duty is determined by the fact that a channel adjusted at an ORK attendant's place is given over to telegraph personnel for operation in accordance with established quality indices.

Each attendant's place ORK consists of two standard bays with monitoring instruments, switching devic s and desks on which are installed service communicatio. apparatus. In this form the ORK attendant's place is

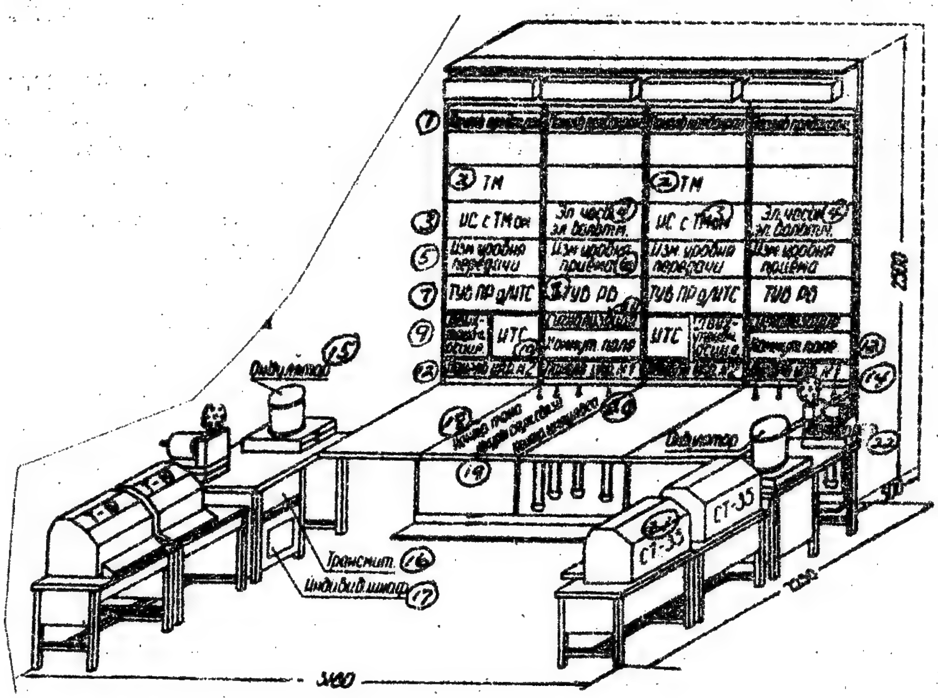

Figure 1

1-Fuse panel; 2-TM; 3-IS with TM; 4-Electric clock, voltmeter; 5-Transmission level meter; 6-Reception level meter; 7-TUV PR g/UTS; 8-TUV RB; 9-Two-tube oscillograph; 10-ITS; 11-Indicators; 12-Switching bank; 13-Control panel No. 2; 14-Control panel No. 1; 15-Undulator; 16-Transmitter; 17-Individual case; 18-Voice-frequency monitoring; 19-Service communications cords; 20-Pulse monitoring 21-ST-35; 22-Tape.

designed for a radio bureau which services simultaneously not over ten radio communications. For a radio bureau with a greater number of radio communications, the ORK is made up of two single ORKs designed for two attendants. (Figure 1). In the following a single ORK attendant's place is described.

The switching panel of each ORK has ten rows of jacks with twelve jacks in each row. The jacks of each row permit full switching and monitoring of the transmitting and receiving channels of one radio communications line. Intermediate apparatus (voice-frequency amplifier-rectifier TUV RB, voice-frequency keyer TM RB) associated with the given communications lines and lines from switchboard positions for telegraph traffic and radio centers are connected to these jacks. Four jacks in each row are used for parallel monitoring of the signals in the channels (parallel monitoring at the line output from the telegraph transmitting apparatus and receiving radio center, and at the line input to the telegraph receiving apparatus and to the transmitting radio center). The assignment of each jack in the row is shown in Figure 2.

The switchboard is wired with a cordless circuit, i.e., in case the intermediate apparatus of the radio bureau are connected to the radio communications, the signals will be automatically received by the terminal telegraph apparatus and connecting lines of radio centers because jacks "Line of receiving radio center - input TUV RB", "Output TUV RB - line of terminal receiving apparatus ", "Line to transmitting radio center - output TM RB" and "Input TM RB - line of terminal transmitting apparatus" are interconnected by means of internal springs.

If a radio bureau has several ORKs, they must be tied together by connecting lines, which permit, if necessary, reservation of an ORK and the switching of communications from one ORK to another. For this purpose the switchboard panel has two lower rows of jacks.

Above the switchboard is located a panel with lamps for indicating failure of radio communications at telegraph switchboard positions.

The composition and arrangement of monitoring-metering apparatus and of the service communications apparatus are shown in figure 1. Telegraph signal meter type ITS RB, level meters, telegraph signal simulator type ISSh (automatic with voice-frequency keyer) are assembled in circuits recommended by the radio communications laboratory of MDRSV. ORK utilizes typical intermediate apparatus TUV RB-2, TUV PR-2, TM RB-2 and a cathode oscillograph with two tubes DTO-2, manufactured by factories of the Ministry of Communications of the USSR.

At the attendant's position ORK, it is possible to make simultaneously the required measurements of voice-frequency as well as pulse signals. For this purpose all the monitoring apparatus for voice-frequency signals is connected to one plug-cord No. 1,"Voice-frequency monitor" and all the monitoring apparatus for direct current pulse signals to plug-cord No. 4, "Pulse monitor".

When plug-cord No. 1 is inserted into any parallel monitoring jack of voice-frequency signals (figure 2), the voice-frequency signals are sent simultaneously to the inputs of all devices connected to this cord. In a similar way, when plug-cord No. 4 is inserted into any parallel monitoring jack of direct current pulses, the latter will be sent simultaneously to the devices connected to cord No. 4.

For measuring the voice-frequency signal level two meters are provided in the ORK circuit: one for measuring the transmitted signal level and the other for measuring the received signal level.

In order to lower the level of transmitted signals at the input of TUV PR to the signal level incoming from the receiving channel, an attenuator (with 2.5 neper attenuation) is inserted in the line of No. 1 plug-cord.

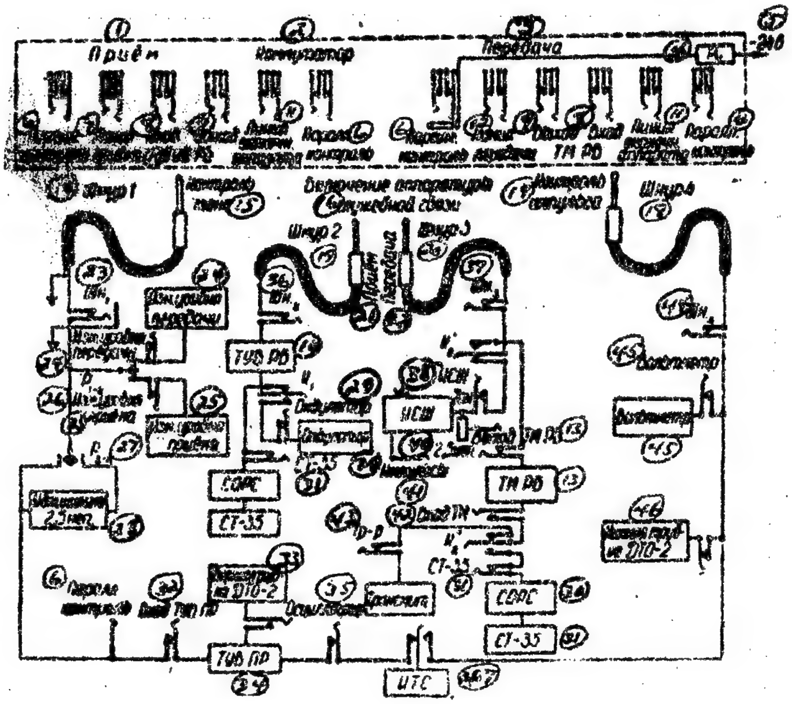

Figure 2

1-Reception; 2-Switching; 3-Transmission; 4-R_4; 5-V; 6-Parallel monitoring; 7-Reception line; 8-Input; 9-Output; 10-TUV RB; 11-Terminal apparatus line; 12-Transmission line; 13-TM RB; 14-Cord 1; 15-Voice-frequency monitoring; 16-Service communications apparatus connection; 17-Pulse monitoring; 18-Cord 4; 19-Cord 2; 20-Cord 3; 21-Reception; 22-Transmission; 23-Shn_1; 24-Transmission level metering; 25-Reception level metering; 26-R_{1-2}; 27-R_{3-4}; 28-Attenuator 2.5 neper; 29-Undulator; 30-SORS; 31-ST-35; 32-Input TUV PR; 33-Upper tube DTO-2; 34-TUV-PR; 35-Oscillograph; 36-Shn_2; 37-Shn_3; 38-ISSh; 39-Tone; 40-2.5 neper; 41-Pulses; 42-TM input; 43-Tr-r; 44-Shn_4; 45-Voltmeter; 46-Lower tube DTO-2; 47-ITS.

The connection of the attenuator and the switching of level meters is accomplished in the following manner:

If plug-cord No. 1 is inserted into the parallel monitoring jack of the receiving line or generally is not inserted anywhere, the receiving level meter is connected to it and the attenuator is disconnected. If, however, this cord is inserted into the parallel monitoring jack of the transmitting line, the receiving level meter is disconnected and to the line is simultaneously connected the transmitter level meter and the attenuator. In order to accomplish this switching, the frame (figure 2) of the parallel monitoring jack of the transmitting line is connected to relay R_4. As a result of this, when cord No. 1 is inserted into the jack, a closed circuit is formed and the relay becomes energized. The contacts of this relay cut in the transmitter level meter and the attenuator.

For measuring the bias, signals from output of TUV PR, in the form of direct current pulses, are sent to the ITS input.

The monitoring of voice-frequency signals (signal shape, interference during intervals between signals) is done by the upper oscillograph tube DTO-2. The voice-frequency signals are sent to the oscillograph after amplification by an amplifier of the lower frequency of TUV PR.

For monitoring the presence and polarity of direct current pulse trains, a 100-0-100 v scale voltmeter, connected to the line of cord No. 4, is used.

The measurement of direct current pulse bias is done by instrument ITS. It is connected to the pulse monitoring line by means of key K_3 which is located on control panel No. 2.

Direct current pulses are monitored on the lower tube of the oscillograph, with signals sent directly to its plate (the input transformer is disconnected in ac-

cordance with recommendations of the radio communications laboratory of MDRSV).

For recording keyed signals, in order to determine the form of distortions, an undulator, which is part of the service communications apparatus, is used.

When testing radio channels, the terminal telegraph apparatus is disconnected and a telegraph signal simulator (ISSh) is connected to the radio communications line (to transmitting jack). Calibrating signals sent to the radio communications line from the ISSh output permit the determination, at the other end of the radio channel (at the correspondent), of the character and degree of distortions introduced by the radio channel. The signal simulator is also utilized for testing the operation of local transmitting channel (monitoring at the output of TUV transmitter), and of the radio bureau intermediate apparatus, which permits uncovering the bias introduced by these apparatus. When testing TUV, voice-frequency signals are sent from the ISSh output through a pad with 2.5 neper attenuation. Its purpose is the same as that of the pad in the line of plug-cord No. 1, i.e., to lower the voice-frequency signal level to the design level of the voice-frequency amplifier-rectifiers in the receiving channels.

The radio bureau operator on duty, whose attendant's place does not depend on the switchboard position for telegraph traffic, can make periodic tests of the state of the radio channels during the time of operation of radio communications. Due to this, he has the possibility of noticing in time the beginning of deterioration in communications, and taking proper steps for normalizing the radio line operation. To ORK are connected lines from several radio communications (up to ten and for a consolidated ORK, up to twenty), which permit the comparison of the operational quality of all communications. This has important value in finding the cause of communications failures.

The ORK operator on duty does technical monitoring in accordance with the monitoring methods developed by

MDRSV.

For service communications with a correspondent, telegraph apparatus, T-19, T-15 or ST-35 are used. Transmission of calls and Morse code messages are done by Creed apparatus (transmitter, undulator and telegraph key) installed at ORK.

The ORK technician on duty can switch, independently, the radio communications channels from commercial operation to local service communications and back. Connection of ORK service communications apparatus to the channel line is made by means of plug-cords No. 2 and No. 3, at which time operating telegraph apparatus are disconnected. Cord No. 2 cuts in the receiving telegraph apparatus and cord No. 3 - the transmitting apparatus and the signal simulator (figure 2).

Keys K_1 (on control panel No. 1) and K_2, (designated K_2' and K_2'' on figure 2) are used for selecting the system of telegraph apparatus (start-stop or Creed). The latter key is located on control panel No. 2. When K_2 is placed in its third position, its contacts K_2' connect signal simulator ISSh to the line.

The ORK circuit provides supplying, from the line to receiving apparatus ST-35(T-15), direct as well as reverse operation by means of a pushbutton switch installed on control panel No. 1.

Since the start-stop apparatus develops single-current train pulses (current and no-current), in order to receive double-current train pulses, the output of transmitting apparatus ST-35 is connected to TM input through relay (SORS). Double-current signals sent from the line to receiving apparatus ST-35 are converted to single-current also by means of SORS.

For reserving the apparatus which enters into the ORK composition, each control panel (No. 1 and No. 2) has twelve four-spring jacks to which (independently of plug-cords) are connected all the monitoring-measuring

instruments, service communications apparatus and the plug-cords themselves (the jacks of the latter are designated in figure 2 by letters Shn_1, Shn_2, Shn_3 and Shn_4).

An instrument or apparatus is disconnected from the general ORK circuit when a plug of a reserve cord is inserted into a corresponding jack.

The circuit provides for the possibility of replacing a faulty plug-cord by a reserve cord by means of inserting the latter into the jack of the faulty cord.

The practice of utilizing ORK on radio communications lines of the Moscow radio bureau has shown the advantage of servicing radio communications by such attendant's places. With the adoption of ORK, it became possible to service a greater number of radio communications with a smaller number of operators on duty.

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NEW STANDARDS

On 1 January 1958, the following new standards are in effect:

GOST 360-57. Wire, steel, galvanized, for conductors and cables. Technical specifications. Replaces GOST 360-41.

GOST 2333-57. Wire, steel. Classification. Replaces GOST 2333-43.

GOST 5365-57. Instruments, measuring. Dials and scales. Technical specifications. Replaces GOST 3007-45 and GOST 5365-50.

GOST 8303-57. Tapes for magnetic recording. Dimensions and methods of testing.

GOST 8476-57. Wattmeters. Technical specifications. Replaces GOST 1845-52 and GOST 3043-53 in the wattmeter section.

GOST 8527-57. Tubes, electron, low-power, type 2Ts2S for commonly used devices.

GOST 8528-57. Tubes, electron, low-power, type 6Ts5S, for commonly used devices.

A DEVICE FOR CHECKING LEVEL INDICATORS AND WIDE-BAND VACUUM-TUBE VOLTMETERS

* * *

This article discusses a device for checking level indicators and wide-band vacuum-tube voltmeters, and gives practical recommendations for the manufacture of the thermoelectric device entering into this instrument.

* * *

In a complex piece of telephone or telegraph equipment, an important role is played by special measuring devices, without which normal operation of electrical communications facilities would not be possible. Among these instruments are level indicators and wide-band vacuum-tube voltmeters. These instruments are available at almost all wire-communications enterprises. They are used to carry out various operating measurements and, in particular, to monitor certain basic performance characteristics of communications facilities – transmission level, attenuation distortion of the channels, etc. The instruments will fulfill their function only if their readings are correct and accurate enough. Therefore it is extremely necessary to make a periodic check on these instruments.

An Instrument for Checking Level Indicators

In the majority of cases, level indicators take the form of VTVM-type instruments whose scales are calibrated not in volts, but in values of absolute level p (with respect to voltage), determined by the formula,

$$p = \ln \frac{U}{0.775}. \qquad (1)$$

Scale zero corresponds to a voltage of $U = 0.775$ v, voltages $U > 0.775$ v correspond to positive readings, and voltages $U < 0.775$ v correspond to negative scale readings.

In order to check level meters by the comparison method, it would be necessary to have a standard meter available which would give accurate measurements over a wide voltage range – from 100 μv to 20 v. Such an instrument is not available, however, and thus a level meter cannot be checked by a simple comparison of its readings with the readings of a standard instrument.

For this reason, level indicators and wide-band

VTVM's must be checked with the aid of an instrument which makes it possible to obtain various levels in the required frequency range with sufficient accuracy. Such a device may be constructed if an oscillator, thermocouple instrument, and nonreactive voltage divider are available. A block diagram of the device is shown in Fig. 1. In this figure, G is the oscillator, TP is the thermocouple instrument, MZ is the nonreactive voltage divider, Z is a load impedance equal to the characteristic impedance of the voltage divider.

The oscillator serves as a source of measuring current. Its frequency range should correspond to the frequency range of the level meters being tested; not less than +3 nepers of power should be available at the oscillator output.

The thermocouple instrument is intended to monitor the current at the voltage-divider input. As a rule it consists of a DC galvanometer and a thermocouple. With the aid of the nonreactive voltage divider, different values of level are obtained across the load impedance.

It is convenient to utilize an attenuation box as the nonreactive divider, since with a matched load, the level at its output is

$$p_2 = p_1 - b, \tag{2}$$

where p_1 and p_2 are, respectively, the level at the output and the level at the input of the attenuation box, b is the attenuation chosen in the attenuation box.

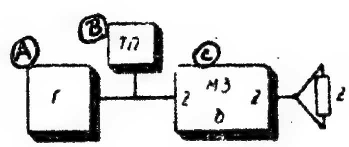

Fig. 1. A) G; B) TP; C) MZ.

The absolute voltage level at the input of an attenuation box whose characteristic impedance is z = 600 ohms, as is known, will equal

$$p_1 = \ln \frac{U_1}{0.775}$$

for

$$p_1 = \ln \frac{I_1\,[ма]\cdot 600}{1{,}29\,[ма]\cdot 600} = \ln \frac{I_1\,[ма]}{1{,}29\,[ма]}. \qquad (3)$$

Thus, as we use the thermocouple instrument to monitor the current I_1, at the same time we will monitor the level p_1 at the attenuation-box input; the magnitude of p_1 is determined from relationship (3). If we then vary the

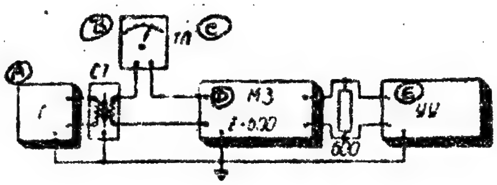

Fig. 2. A) G; B) ST; C) TP;
D) MZ; E) UU.

attenuation of the attenuation box, we will obtain any required voltage level p_2 across the impedance $\underline{z}$, in the range from p_1 (where $b = 0$) to $p_1 - b$, in accordance with formula (2).

Where $p_1 = b$, scale zero of the instrument is checked, for values of $\underline{b}$ less than p_1, positive readings are checked, and finally where $\underline{b}$ is greater than p_1, negative readings on the instrument scale are tested.

In order to test level meters, we set up the circuit shown in Fig. 2. Here ST is a matching transformer; UU is the level indicator under test; the remaining designations are the same as in Fig. 1.

Determination of Error

The error in the readings of an instrument, as a rule, are characterized by the degree to which its readings approximate to the true value of the quantity measured by the instrument. Three types of error are distinguish[illegible] absolute error, relative error, and reduced error. The technical specifications for level indicators, as a rule, standardize the absolute error, which is represented as the difference between the meter reading and the actual value of the quantity measured. Consequently, absolute error is expressed in the same units as is the quantity being measured.

If we designate the value of the measured quantity found with the aid of the instrument by A_x, and its actual value by A, then the absolute error will equal

$$\Delta A = A_x - A. \tag{4}$$

The absolute error, taken with the opposite sign, is called the correction. The correction is that quantity which must be added algebraically to the meter readings in order to obtain the actual value of a measured quantity.

When the circuit of Fig. 2 is used to check a level meter, the attenuation of the box MZ is always changed so as to make the level-indicator needle coincide with a mark on the scale. Consequently, the level corresponding to the mark on the scale will represent a magnitude measured by the level indicator. We let p_x represent this level; then $p_x = A_x$.

The actual value of the measured level is determined by the level at the output of the attenuation box

$$A = p_1 - b. \tag{5}$$

Thus, in our case the absolute error may be found from the formula

$$\Delta p = p_x - (p_1 - b). \tag{6}$$

It follows from Eq. (6) that if the equality

$$p_x = p_1 - b_0, \tag{7}$$

holds for some attenuation b_0, the measurement error Δp will equal zero. In this case, the tested level value appearing on the scale of the level indicator corresponds to the level at the attenuation-box output. Most frequently, however, the position of the level-indicator needle will correspond to a scale mark for which the attenuation b is larger or smaller than the attenuation b_0; then

$$p_x \gtrless (p_1 - b), \tag{8}$$

here the calibration error of the instrument, according to Eqs. (6) and (7), is determined by the formula

$$\Delta p = b - b_0, \tag{9}$$

and the correction will equal

$$-\Delta p = -(b - b_0) = b_0 - b. \tag{10}$$

Checking Wide-Band Vacuum-Tube Voltmeters

The calibration error of a wide-band vacuum-tube voltmeter may be checked by comparing its readings with the readings of a type ASTV AC voltmeter (class 0.5). But such a check can only be carried out at the frequency of 50 cps. The error caused by nonuniform frequency response, however, cannot be checked with a voltmeter, since there are no standard voltmeters covering a wide frequency range.

In order to check the frequency response of wide-band vacuum-tube voltmeters, whose scales are calibrated directly in volts, the circuit shown in Fig. 2 may be utilized. In this case, where the characteristic impedance of the attenuation box MZ = 600 ohms, and the load z = 600 ohms, the voltage at the output of the box will be

$$U = \frac{I_1 \cdot 600}{e^b}, \tag{11}$$

where b is the attenuation of the box, I_1 is the current monitored using the thermocouple instrument.

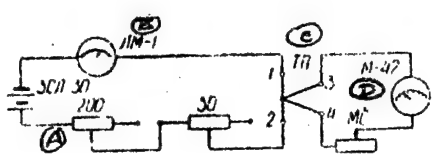

Fig. 3. A) 3SL-30; B) LM-1; C) TP; D) MS.

The Thermocouple Instrument of the Device for Checking Level Meters

In setting up the workplace at which level-meter checking will be carried out, it is not difficult to select an appropriate oscillator and attenuation box from the rumber that are produced domestically. This is not the case with the thermocouple instrument; not a single one of the available instruments will serve our purpose. A suitable thermocouple device, however, may be manufactured on the spot.

In order to make a thermocouple device suitable for

calibration of level indicators, it is necessary to use a thermocouple having the following characteristics: heating current, 30 ma; heating resistance, 10-15 ohms; emf, 12-13 mv; thermocouple resistance, 15-18 ohms.

It is necessary to select a galvanometer for the thermocouple. There is no commercially available galvanometer that we would be able to recommend in unmodified form for use in the construction of this thermocouple instrument.

Fig. 4. A) Nepers.

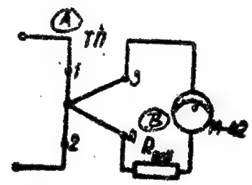

Fig. 5. A) TP; B) R_{dob}.

After modifications, which amount to rewinding the coil and replacing the springs, a type M-42 galvanometer may be used. In modifying this type of galvanometer, it is necessary to use type PE-0.15 copper wire (0.7 g per instrument) and springs having a torque of M = 4 mg/cm (two pieces per instrument).

The galvanometer coil is wound without a form, using PE-0.15 wire, wound in several layers, turn-to-turn i each layer. The total number of turns should not be less than 70. The resistance of such a coil, measured with a DC bridge, should be 3.4-3.5 ohms, and the resistance of the springs should be about 2.4-2.7 ohms.

In order to calibrate the thermocouple instrument, it is necessary to have a type LM-1 (class 0.5) milliammeter with a 30-ma scale, a 200-ohm rheostat, a 30-ohm rheostat, a 10-ohm resistance box, and two type 3SL-30 dry cells.

The circuit of Fig. 3 is used as the basis for calibration. Using the LM-1 milliammeter as a standard, the rheostats are used to establish a current of 30 ma. Then, varying the resistance box MS that is connected between the thermocouple TP and the M-42 galvanometer that is being calibrated, we obtain the maximum needle deflection of this galvanometer. The scale point at which the needle stops will correspond to a 30-ma current.

Next, without changing the resistance of MC, we use the rheostats to set up a 25.93 ma current in the circuit

of the LM-1 milliammeter, and place a mark on the M-42 scale corresponding to the position of the needle. Then, in the same way, we in turn set up currents of 15.71, 9.53, and 5.78 ma, noting for each value the position of the needle on the M-42 galvanometer scale. These currents will correspond (for a 600-ohm resistance) to levels of +3, +2.5, +2, and +1.5 nepers. The graduation marks are used to inscribe the thermocouple-device scale (Fig. 4).

The remaining steps in the calibration and inscription of the thermocouple-device scale are carried out on the basis of the circuit shown in Fig. 5. The multiplier R_{dob} whose value should correspond accurately with the value of the resistance of the resistance box during calibration, and the thermocouple (which has been wrapped in cotton) are placed within the M-42 galvanometer. After assembly, the thermocouple device is finally checked against the LM-1 standard meter, and then sealed.

Since there are a large number of level indicators and VTVM's in service, it would be desirable, in order to provide for testing by representatives of the departmental supervisor, for industry to arrange for the production of balanced and unbalanced attenuation boxes with thermocouple devices installed in them.

I.Ye. MOISEYEV, Engineer, Junior Scientific Associate, TsNIIS (Central Scientific-Research Institute for Communications)

A SWITCHING CIRCUIT FOR RADIOBROADCAST PROGRAMS

In radiobroadcast equipment (RVA), circumstances involved in switching radiobroadcast programs differ from those involved in switching circuits, for example, at MTS (Long-Distance Telephone Offices). Thus, at an MTS, a channel is tested after switching, and is only then turned over to the subscriber. During the time that this test is being carried out, any errors made in switching may be eliminated. In RVA, one program must follow the other; as soon as transmission from one studio is concluded, it is at once necessary to switch the station to another studio; in this case, it is impossible to perform a test after switching, since there is no time for such a test.

Thus, RVA switching is completed the instant the connections themselves have been switched. Since a great many connections must be switched during separate time intervals (for example, in the transmission of time-check signals to all stations, followed by the transmission of various programs), the engineers doing the switching must act very decisively and efficiently. Even so, unavoidable errors will occur; although they may be corrected, they will unavoidably lead to the transmission of strange things over the air.

In working out the design of the Central Equipment Room of the Leningrad Radio Building, one of the problems was to devise a switching system which would make it possible to set up programs in advance, and, consequently, permit a check on switching.

This specification was introduced in order to permit the personnel operating the RVA to set up various program combinations without consideration of the switching interval, i.e., under calm conditions, and so that they may carefully check the preliminary switching set-up. Final switching of the previously selected program combinations should be carried out by means of a single control covering the entire set-up.

Such a switching system has been developed by the Institute for Radio Reception and Acoustics, and has been installed in all equipment rooms of the Leningrad Radio Building. Extended operation of this circuit has demonstrated its great advantages in comparison to the circuit used previously. It provides authoritative handling of radiobroadcast programs, makes it possible to minimize pauses between different programs, and completely eliminates garbling and dead air owing to incorrect switching.

Let us briefly consider the switching circuit utilized at the Leningrad Radio Building.

Switching of the audio and signal circuits of the program sources (studios, relay lines, etc.) to the broadcast facilities (amplifiers, radio stations) is carried out with the aid of relays. Preliminary matching of program sources to transmission facilities (more accurately, setting up for the connection of the relays required for the matching) is carried out with the aid of a switch. The relays are connected in by means of a nonlocking button, common to any choice of program.

The figure shows the switching circuit in simplified form. For each program facility there is a two-pole selector-switch with as many contacts as there are program sources, a single control relay with a button, and as many switching relays as there are program sources.

As an example, let us consider a case in which two program sources and one transmission facility are to be switched (for a larger number of program sources, it is only necessary to increase the number of switching relays, and for a larger number of transmission facilities, the number of sets of relays and selectors are increased). In preliminary switching, selector S_1 must be set into the position in which the first contact is engaged. When this is done, lamp LP_1 above the selector lights, signaling that preliminary matching of the given transmission facility to the first program source has been carried out.

When it is necessary to transmit the program to the facility, nonlocking button K_1 is pressed. When this is done, control relay RU_1 operates (type RM-U-171-76-73). It should be so adjusted that wiper contact 2 at once meets contact 1, and all three contacts are closed; then, while contact with contact 1 is maintained, the latter should be disconnected from contact 3.

When this happens, positive voltage flows from contact 1 through contact 2 of relays RU_1, P_1, and contact 1 of the selector, and is applied to winding 1 of relay RK_1 (type U-171-76-75); contacts 3-4 of relay RK_1 close, connecting winding II with contact 3 of relay RU_1. Since button K_1 is released at this instant, the armature of rela[y] RU_1 drops out, and positive voltage begins to flow to co[n]tact 3 from contact 1.

The armature of relay RK_1 will be pulled up, since current flows in winding II. Contacts 5-6 and 7-8 connect the program source to the transmission facility, contacts

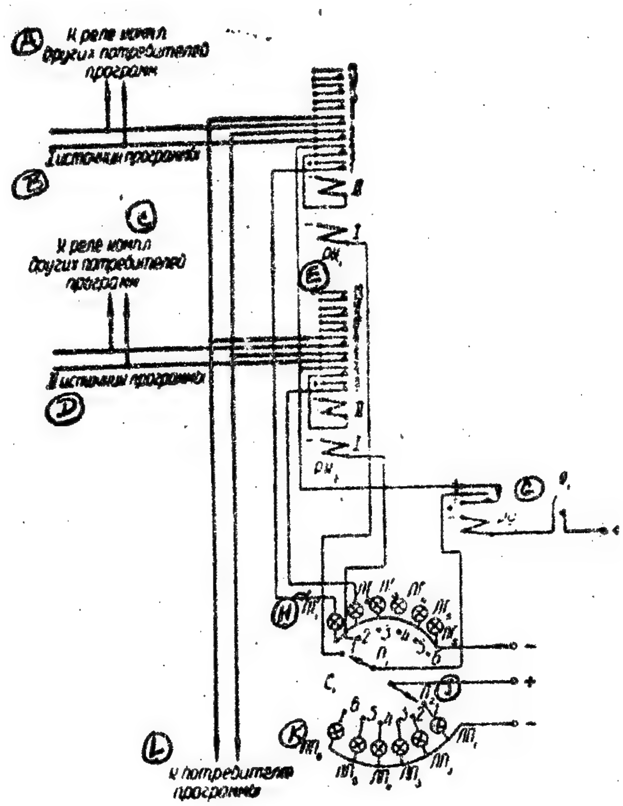

Figure. A) To relay units of other program-transmission facilities; B) program source I; C) to relay units of other program-transmission facilities; D) program source II; E) RK_1; F) RK_2; G) RU_1; H) LG; I) P_1; J) P_2; K) LP; L) to program-transmission facility.

1-2 close the circuit of lamp LG_1, which signals that the first program source has been switched in, contacts 9-10, 11-12, 13-14 connect appropriate signal circuits not shown in the diagram.

After switching has been set up, it is possible to carry out the next preliminary program selection, for example, preparation for switching a program source to the first transmission facility. To do this, it is necessary to set the selector in the second position, whereupon lamp LP_1 will go out, lamp LP_2 will go on (indicating preliminary selection of the second program), but the armature of relay RK_1 will remain pulled up until button K_1 is pushed.

When button K_1 is pushed, relay RK_2 operates, connecting in the second program source, and relay RK_1 drops its armature, since when relay RU_1 operates, positive voltage ceases to flow to winding II of relay RK_1.

As the description shows, the circuit makes it possible to carry out preliminary program selection and to obtain signals that indicate whether or not this selection has been properly made (lamps LP); the actual switching will take place instantaneously at the required moment, and is indicated by lamp LG. In order to provide for complete disconnection of the switching system, one contact of selector S_1 is left open (zero contact).

The circuit that we have described has been used in our Central Equipment Room for switching 22 program sources to 12 transmission facilities. At the control console, 12 selectors have been installed by means of which any program is switched to any of the 12 transmission facilities. Each selector unit contains 22 RK relays, a single RU relay, and one button, K.

Final switching for each of the 12 transmission facilities is carried out by means of an individual button. Where necessary, however, switching may also be carried out by groups, or using ganged buttons (in this case it is possible to connect or disconnect any number of program facilities in any combinations simultaneously). For this purpose, the individual-button circuits are switched over t ganged-button circuits by means of special switches.

P.A. PALLADIN, Chief of the Leningrad Radio Broadcast Center

FREQUENCY-MEASURING DEVICE

* * *

The article describes the design, composition, and arrangement of individual units of a frequency-measuring device developed by the staff of the LDRSV (Leningrad Administration for Radiocommunications and Radiobroadcasting).

The device serves to measure nominal carrier frequencies of radiobroadcast transmitters at the point of reception; measurements are accurate to within about $0.5 \cdot 10^{-6}$. In addition, using the instrument, it is possible to measure frequency deviation and to observe the radiated spectra of FM transmitters.

* * *

Precision instruments which can be used to both measure and monitor radio-station frequencies, and permit very high accuracy in such measurements, are quite complex and expensive. It is almost impossible for operating enterprises to manufacture such devices themselves. Locally available devices — various types of heterodyne and resonance wave meters or crystal calibrators — cannot provide, however, sufficiently accurate frequency measurements. As a result, in many cases, the nominal carrier frequency of shortwave transmitters is not properly monitored.

The frequency-measuring device described below is simple to make and to adjust, and at the same time permits frequency measurements to be made that are accurate enough for modern requirements (accurate to within about $0.5 \cdot 10^{-6}$).

S.I. Stolyarov, an engineer at the Leningrad Administration for Radiocommunications and Broadcasting (LDRSV), suggested the basic circuit for the device; the device itself was developed and manufactured by the staff of the laboratory and the repair-production group of the LDRSV.

In addition to measuring the nominal frequency of medium- and shortwave radio stations over the 540 kc to 30 Mc band, the device makes it possible to determine the frequency deviation of FSK and Twinplex FSK transmitters to within $\pm 2\%$, and also permits visual monitoring and observation of the radiation spectra of FM shortwave transmitters.

Figure 1 shows an exterior view of the device; it measures 2000 mm x 540 mm x 500 mm. The functions of the panels are as follows (from top to bottom): loudspeaker; panoramic indicator; AR-88 receiver; frequency meter; multivibrator, crystal oscillator, and second heterodyne; zero-beat indicator; frequency multiplier for local sta-

tions; power-supply unit. All panels are provided with contact plugs; during inspection or repair, they may easily be pulled out, and connected in with the aid of a flexible cable.

Power is supplied to the unit fro the 127 or 220 v AC line; it draws about 450 watts of power. Common power-supply voltage regulation is provided for all units (with the exception of the AR-88 receiver) by means of a ferroresonance regulator; in addition, supply voltage for the plate circuits of all heterodyne units are regulated using SG-4S gas-filled regulators.

Frequency measurements are based upon the principle (Fig. 2) of determining the difference between the measured frequency and one of the standard frequencies available in 5-10- or 50-kc steps. The set of standard frequencies is obtained by dividing harmonics of a multivibrator whose fundamental is 50 kc. The multivibrator is locked on the second harmonic of a 100-kc crystal oscillator.

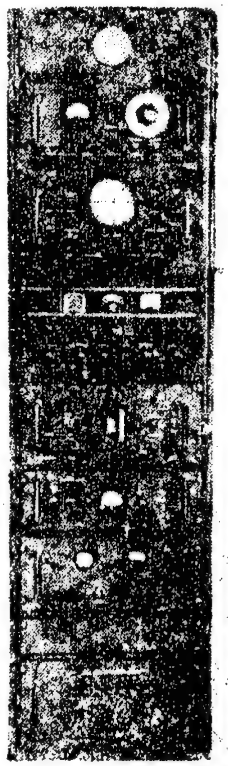

Fig. 1

The distinctive feature of the method for obtaining the set of frequencies with 5- or 10-kc steps consists in the fact that these frequencies are not generated directly by 5- or 10-kc multivibrators, but are obtained as the result of modulating the 50-kc modulator by means of 5- or 10-kc auxiliary multivibrators. The latter, in turn, are locked to the main multivibrator, thus ensuring the necessary stability of the standard-frequency markers. The circuits that carry the modulating voltage are at the same time sync circuits.

This method of obtaining standard markers provides markers at 50-kc intervals that are sharply differentiated in terms of level. This makes it easy to read off and determine the nominal frequency of a harmonic on the receiver scale, since the error in scale calibration does not exceed 50 kc. In addition, the measured frequency is known roughly, as a rule.

The basic advantage of the modulation method used is that the relationship between the amplitudes of the standard markers lying at 50-kc intervals, and those lying at 5- or 10-kc intervals does not change from band to band.

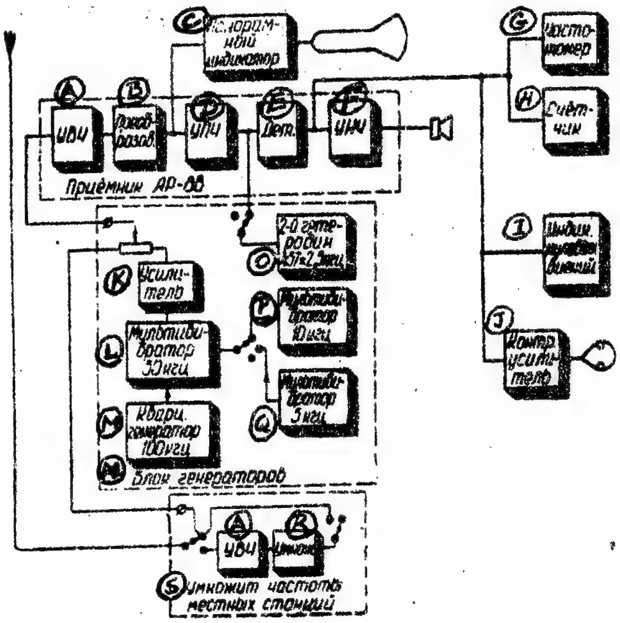

Fig. 2. A) UVCh (RF amplifier); B) converter; C) panoramic indicator; D) UPCh (IF amplifier); E) detector; F) UNCh (audio amplifier); G) frequency meter; H) counter; I) zero-beat indicator; J) monitor amplifier; K) amplifier; L) 50-kc multivibrator; M) 100-kc crystal oscillator; N) oscillator unit; O) second heterodyne, 457 ± 2.5 kc; P) 10-kc multivibrator; Q) 5-kc multivibrator; R) multiplier; S) local-station frequency multiplier.

The standard-frequency markers and the frequency of the monitored station are observed on the screen of the panoramic indicator. Both frequencies, the standard (multivibrator harmonic) and the measured (transmitter carrier), are finally applied to the second detector of the receiver; an audio beat frequency appears at its output.

If this difference frequency does not exceed 20 cps, it may be determined directly with the aid of an electromagnetic counter which registers the number of cycles over a specified time interval. Where the beat frequency is greater than 20 cps, it is measured by means of a RC frequency meter. The measurement may also be made using an external audio oscillator and Lissajous figures. In this case, the panoramic indicator is switched to an oscillograph cir-

cuit; voltage from the receiver detector output is applied to the vertical-deflection amplifier, and the audio-oscillator voltage to the horizontal amplifier.

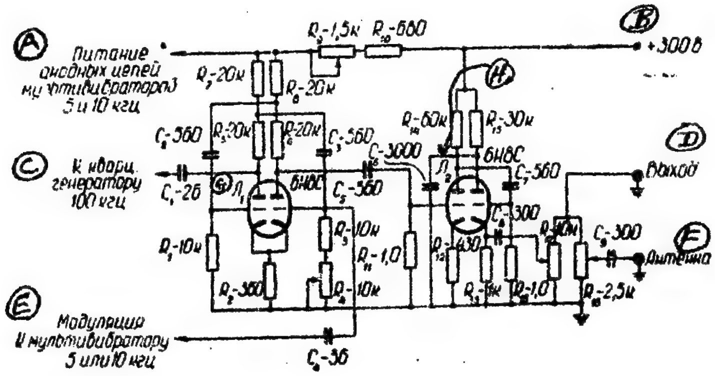

Fig. 3. A) 5- and 10-kc multivibrator plate-supply circuits; B) + 300 v; C) to 100-kc crystal oscillator; D) output; E) modulation, to 5- or 10-kc multivibrator; F) antenna; G) L_1, 6N8S; H) L_2, 6N8S.

The frequency deviation of FSK and Twinplex transmitters is determined by the double-heterodyne method, and a smoothly adjustable second oscillator is provided for this purpose in the device. The oscillator generates the receiver intermediate frequency; the oscillator frequency may be varied over several bands. Each scale division on the oscillator adjustment is equivalent to 25 cps with the ±1-kc band, and 100 cps with the ±2.5-kc band.

In order to measure the frequency of local long-wave stations whose nominal value does not lie within the wavelength range of the AR-88 receiver, a TRF receiver with several fixed tuning points is provided in the device. The carrier frequency obtained is multiplied by a factor of five or ten and applied to the input of the main receiver, after which it is measured in the normal manner.

In order to measure the beat frequencies produced by the receiver detector, it is necessary to equalize the voltage amplitudes of both frequencies in the receiver audio channel. In order to do this, provision is made for measurement, over wide ranges of levels, of signals both at the antenna and at the multivibrator output. Level regula-

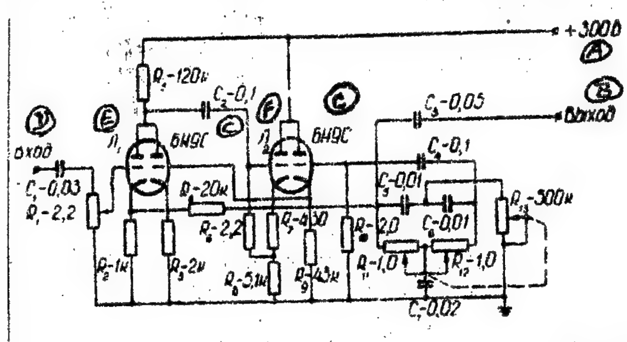

Fig. 4. A) + 300 v; B) output; C) 6N9S; D) input; E) L_1; F) L_2.

tion can be made very graphic, owing to the utilization of the panoramic indicator.

When the double heterodyne is used to measure frequency deviation, the second-heterodyne frequency is at once matched to that of the standard harmonic, and then to the measured signal at the receiver intermediate frequency. The magnitude and sign of the frequency deviation is found directly from the second-heterodyne scale.

In this case, the utilization of a meter-type zero-beat indicator makes it possible to set the appropriate frequency to within 0.5 cps.

The zero-beat indicator is also invaluable in measuring the frequency of medium-wave stations.

The basic condition which must be met in order to obtain accurate results in the measurements is that the synchronizing 100-kc crystal oscillator be calibrated to within ± 0.01 cps. Such a high degree of accuracy may be obtained by regularly comparing the higher harmonics of the crystal oscillator with a still more accurate standard. This comparison is made daily at 10 Mc, a frequency that is available from a frequency-standard broadcast station. In between tests, frequency stability of the crystal should be maintained by means of an automatic thermostat. Let us discuss the circuits of individual units of the device.

<u>50-kc multivibrator.</u> Figure 3 gives the basic circuit for the main 50-kc multivibrator and its output amplifier. The 10- and 5-kc multivibrators use similar circuits. The sync voltage from the crystal oscillator is applied to the plate of the left-hand triode of the multivibrator tube L_1 through capacitor C_1. The main 50-kc signal is modulated by the 5- and 10-kc frequencies in the grid and plate circuits. A plate-circuit coupling resistor has

been made variable in order to make it possible to adjust the relationship of the levels of individual harmonics in different portions of the receiver wavelength range.

Output level is controlled with the aid of a potentiometer in the cathode circuit of the right-hand triode of tube L_2, which is cathode-follower connected. Signals from the antenna, passing through a level regulator — potentiometer R_{18} — are mixed into the same circuit.

<u>20-300 cps RC frequency meter</u> (Fig. 4). The frequency meter takes the form of a selective audio amplifier. A twin RC bridge is used as the selective element; it is connected in a negative feedback circuit taken around a resistance-coupled amplifier stage that uses tube L_1.

The RC bridge is connected between two cathode followers (both triodes of tube L_2), which makes it possible to obtain sharp resonance in the selective amplifier. The bridge is tuned using three ganged resistors having a dial calibrated to within 2%; bridge tuning is determined on the basis of the maximum output voltage, indicated directly by a meter or with earphones.

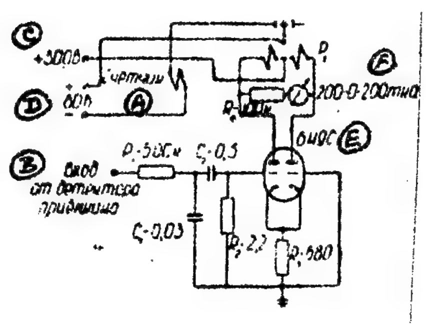

Fig. 5. A) Counter; B) input from receiver detector; C) + 300 v; D) 80 v; E) 6N9S; F) μa.

<u>Counter for measuring frequencies below 20 cps</u> (Fig. 5). The electromagnetic counter takes the form of a telephone relay whose armature is connected to a gear system with ten-step registration. The counter winding is energized by rectangular current pulses from the contacts of telegraph relay R_1. The latter is connected into the plate circuits of the 6N9S triodes by means of a differential circuit. This stage is a paraphase amplifier for the beat frequencies taken from the second detector of the receiver.

A permanent-magnet moving-coil microammeter with a center zero is connected between the plates of the amplifier tubes and is used as the zero-beat indicator.

Panoramic indicator. This unit of the device basically uses the circuit described in the handbook "Rationalizer's* suggestions in the field of radiocommunications, radiobroadcasting, and radar" (Svyaz'izdat, 1956).

Its basic electrical characteristics are as follows: band coverage 10, 20, and 50 cps; sweep rate 50 cps; resolving power 1.5 kc (10-kc band); input sensitivity 100 μv; first IF 457 kc; second IF 143 kc. A type 13L037 cathode-ray tube is used in the indicator.

A.Ya. STUKMAN, Senior Engineer of the Laboratory of the LGRSV

*Personnel making suggestions to improve methods or equipment.

THE WORKSITE OF THE WIREPHOTO OPERATOR

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Examined in the article are the purpose, layout, and basic assembly circuit of the worksite of a wirephoto operator.

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In handling wirephoto apparatus, the operator, in addition to controlling the apparatus, performs a number of other working operations. He formulates the photo telegrams, loads the transmission drums with blanks, replaces the drums and magazines, makes notations in the operational and technical records, etc. In order to provide the operator with the necessary conveniences, it is recommended that a special worksite be equipped for him. At this worksite, there should be devices, by means of which he can carry on service conversations and perform certain functions connective with the technical handling of wirephoto communications.

The worksite discussed in the present article is designed to serve two FT-38 (FT-37) sets by one operator. It consists of a table and a special "attachment" (Fig. 1) installed on it. The dimensions of the table are 830 mm x x 600 mm x 700 mm. The table is located between the two sets, forming a common unit with these. Any table can be used to equip this worksite but a table whose top has a slight incline is preferable.

Four receiving magazines and three transmitting drums can be placed on the attachment. This number is fully adequate for normal handling of a duplex link, operating at a maximum rate.

The magazines are placed on the attachment in an inclined position, with the slit below; this prevents gating of the photographic paper, even in the event of prolonged holding of the loaded magazine, and likewise facilitates the placement of the magazine after its loading and working with it while the communications link is being maintained.

The transmitting drums are placed in special, horizontal grooves. In the upper part of the attachment, there is a slot in which is inserted a card designating the terminal point of the link.

In the lower part of the attachment, there are several pigeon holes, the sizes of which can be varied by rearranging the partitions. In these are placed the transmitted and nontransmitted phototelegrams.

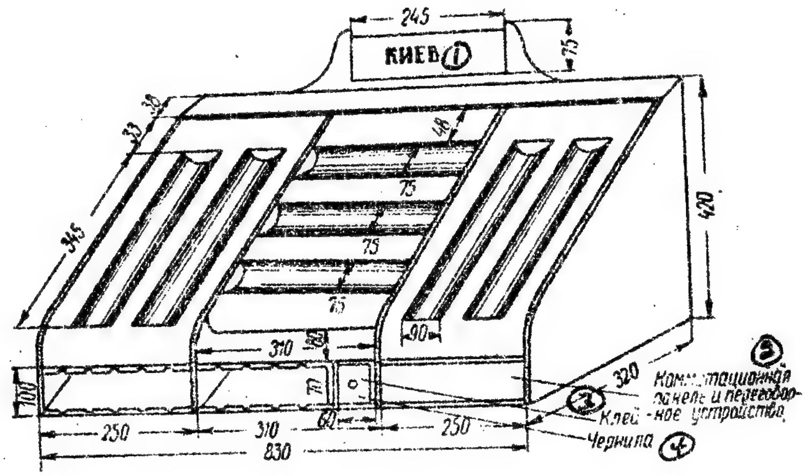


Fig. 1. 1) Kiev; 2) switchboard panel and talking device; 3) glue; 4) inks.

The phototelegrams are prepared and the drum loaded with blanks directly on the table. Since approximately 90% of the phototelegrams are written on small blanks (1/8 and 1/6 of a full-size blank), baffles with a clamp spring (Fig. 2) are inserted into the pigeon holes in order to facilitate the stacking of these blanks.

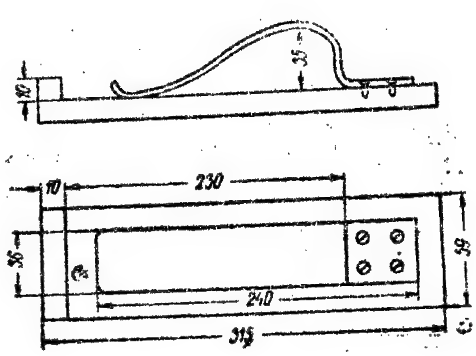


Fig. 2.

Paste and ink are kept in a separate draw of the attachment, which can be pulled out while the attachment is being used. This prevents cases in which the worksite and blanks might be dirtied by either paste or ink. The operational documents and technical journal are kept in the lowe left section.

In the lower right part of the attachment, are mounted the talking device and switchboard panel. The talking device is fed by $\pm$ 120 v DC current which is supplied to the wirephoto apparatus. Changing the channel from the wire photo apparatus to the talking device is accomplished by means of a key, the pressing of which lights up a signal tube.

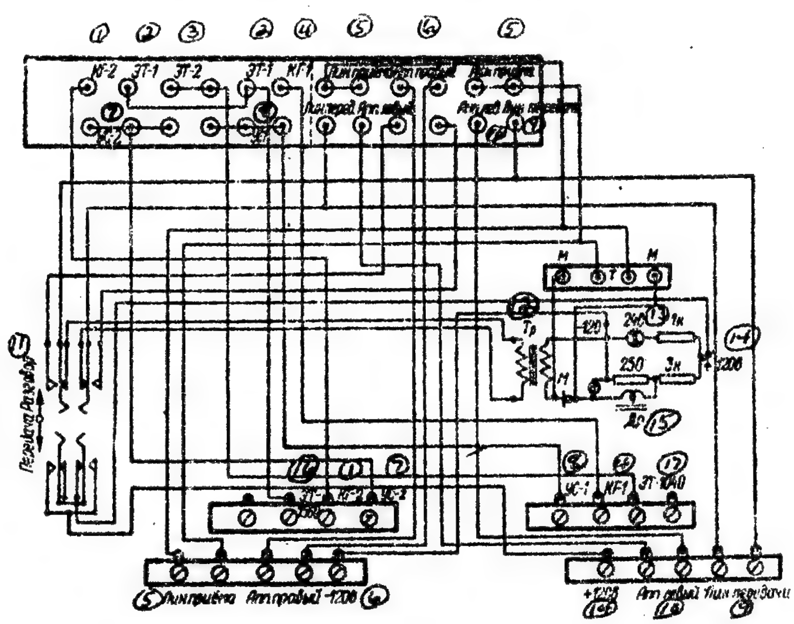


Fig. 3. 1) KG-2; 2) ZT-1; 3) ZT-2; 4) KG-1; 5) incoming line; 6) right set; 7) US-2; 8) US-1; 9) transmitting line; 10) left set; 11) transmission-talking; 12) TR; 13) 24 v; 14) + 120 v; 15) choke; 16) ZT-1560; 17) ZT-1040.

One of the two wirephoto sets installed on both sides of the operator's table can be used as a transmitting set, while the other is used as the receiving set. For this purpose, the trunks coming into the common switchboard bay do not terminate in the set, as before, but in the working

site of the operator (transmission line and incoming line). Switching the sets from transmission to reception and conversely is done by moving four little switches at the operator's worksite; in which case, no switching is done on the common switchboard bay. Thus, the operator can switch on the sets without the participation of the technician on duty.

Our experience in the operation of the FT-38 (FT-37) wirephoto sets shows that in order to obtain a stable duplex link over them, it is necessary to use one of the standard tuning-fork generators in order to synchronize both wirephoto sets, as well as one standard tuning-fork generator for the power supply of the synchronizing systems of all these sets in the wirephoto apparatus room. Consequently, provision is made in the circuit of the operator's worksite for the possibility of converting from one type of synchronization to the other. For this purpose, the "terminal post tuning-fork generator outlet" and "input of the synchronizing-unit amplifier" are mounted on the switchboard panel of the worksite. The outlets of the common 1560 and 1040 cps tuning-fork generators are also connected up to the panel mentioned above. The synchronizing systems are switched on by means of the little switches; in this case, there is no need to take out the tube in the unused tuning-fork generator and connect up the sets by means of cords, as has been done up until now in certain wirephoto units.

The basic-assembly circuit of the switchboard panel and of the talking device is shown in Fig. 3. The switchboard panel and talking device are combined on the draw-out mounting plate of the attachment. The lines and synchronization circuits are connected to the backside of the attachment. This part of the attachment has a movable lid; the rest of it is permanently covered.

The device described above greatly facilitates the work of the operator and helps to increase his labor productivity and improve the quality of phototelegram processing. It can also be used on links equipped with FTAM duplex wirephoto sets. In this case, there is no need to install a talking device and switchboard panel at the worksite, since these are provided in the wirephoto apparatus itself.

S.O. MEL'NIK, Engineer of the Central Telegraph Office of the USSR

REDESIGNING THE CONFERENCE-CIRCUIT OUTLET AT THE GOR'KIY INTERURBAN TELEPHONE EXCHANGE

The regional conference-circuit (DGTS) outlet at the Gor'kiy Interurban Telephone Exchange has been redesign The center had been previously equipped with obsolete amplifier equipment of the SU-6M type, and occupied a building 30 m^2 in area.

After being redesigned, the DGTS outlet occupies only two square meters, and this saving in production space is indeed of great importance to our Exchange.

This reduction in the dimensions of the DGTS center was obtained by using radio-retransmission equipment of the TU-100 type as a power amplifier. The mounting plate from the SUTU bay was used as additional amplifiers. The control panel of the unit is of the table-model type; keys are mounted on it for switching the channels from transmission to reception. The jacks, by means of which the channels are monitored and power is fed to the amplifiers and which decouple the circuits are separate for each channel. All of the equipment for the DGTS unit is located on one table.

The circuit of the regional DGTS center prior to its redesigning (Fig. 1) did not ensure adequate operationa stability of the apparatus, due to the existence of feedbac in the studio from which the transmission is made, between the transmitting channel and the receiving channel, through the amplifiers 1 and 3.

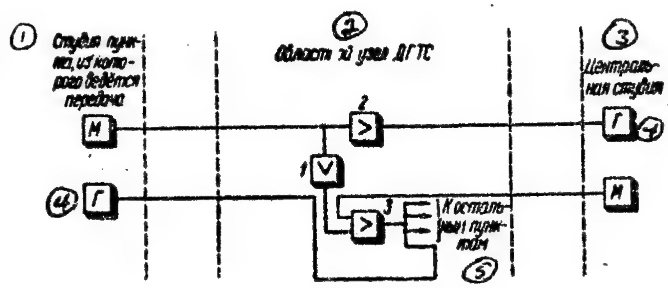


Fig. 1. 1) Studio at the point from which the transmission is made; 2) regional DGTS outlet; 3) central studio; 4) G; 5) to the remaining offices.

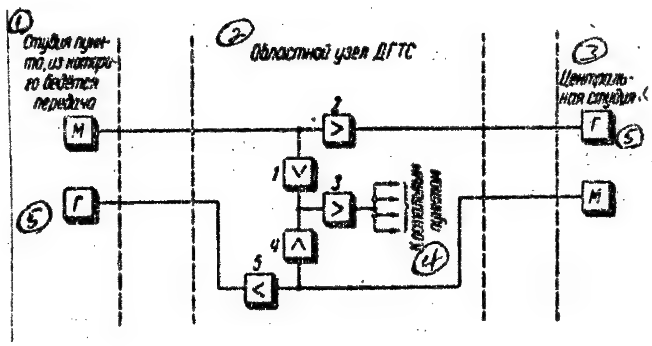


Fig. 2. 1) Studio of the office from which the transmission is made; 2) regional DGTS outlet; 3) central studio; 4) to the remaining offices; 5) G.

In the circuit of the redesigned outlet (Fig. 2), this feedback was eliminated by inserting the blanking amplifier 4, which was introduced into the circuit at the suggestion of the author of the present article. It is apparent from the circuit that only the central studio (through the amplifier 5) is heard through the loudspeaker G, installed in the studio of the office from which the transmission is made; the remarks made by those participating in the studio are heard here, not through the loudspeaker, but directly. The circuit discussed is the usual four-wire communications circuit.

The transmission and reception routes are not connected with each other. The amplifiers 1 and 4 are connected opposite each other and serve to disperse the speaking currents, which are amplified by the power amplifier 3 and enter the channels leading to the remaining offices (apart from the office from whence the transmission is made).

In order to ensure fully the operation of the DGTS system according to the new circuit, corresponding alterations must be made in the interdistrict DGTS to all centers. We have already done this.

The modernized DGTS center at the Gor'kiy Interurban Telephone Exchange has been tested in operation and showed good audibility.

B.P. DOBROLYUBOV, Chief Engineer of the Gor'kiy Interurban Telephone Exchange

STANDARDIZATION OF LABOR IN DISTRICT COMMUNICATIONS OFFICES
(By Way of Discussion)

In drawing up production-financial plans, communications enterprises proceed from the necessity to increase the volume of production (communications services), revenues, and labor productivity, to reduce operational costs, and to improve the qualitative operational indexes on the basis of a utilization of internal reserves and of the introduction of new equipment and advanced methods of labor.

Practice shows that an expanded volume of work can be carried out by existing personnel complements if labor in the communications enterprises is correctly organized, especially in the district offices in which it is an extensive practice to attend the wire and radio communications facilities jointly.

Labor can be organized correctly through the intense study of all the production processes, and through the application of output standards which are technically sound, output standards which can be used as a basis for the elaboration of new, more progressive standards for the establishment of the production personnel complement of communications enterprises. It is extremely important, in the preparation of production-financial plans, to determine the number of necessary personnel (to carry out operations in the planned volume) on the basis of labor standards for all categories of workers, and with the calculation that each worker will be occupied with productive labor during the entirety of the working day. In case a worker does not have a full load in his basic activity, professions should be combined on an extensive scale. If, during the study of the work load, it appears that the labor productivity of certain workers is below the planned standards, the causes of the situation must be studied and measures undertaken to organize the labor processes more efficiently and to raise the qualifications of the communications employees, etc.

The existing standards for the calculation of production personnel complements are outmoded and not in keeping with the requirements of advanced labor organization and modern technology. These standards do not take into consideration the fact that the labor productivity of communications employees has risen as a result of the transition to a shorter working day on Saturdays and the days before holidays. Furthermore, these standards contain inade-

quate instructions on the determination of labor costs when telecommunications and wire-broadcast facilities are serviced jointly. In fact, the existing standards for the personnel complements of district communications offices, which were established in 1953, permit the determination of labor costs only in the branches of the wire-broadcast and intra-district telephone system (VRS) — even then, not for the entire volume of work, since the standards do not indicate how to calculate the personnel complement for work in repairing the line plant and subscribers' telephones, work in development, etc.

Standards for the determination of personnel complements of telegraph operators, GTS (city telephone exchange) and MTS (long-distance exchange) telephone operators, and workers in other specialties are not available to the district communications offices. The standards for the calculation of GTS complements are understated in some sections, leading to the employment of unnecessary personnel. According to the standards, for example, there should be three employees for the technical maintenance of a telephone exchange with a capacity of 300 to 500 numbers. In fact, such exchanges are serviced in the district centers by one technician or — at the maximum — two.

The calculations of personnel according to the standards established for telegraph operators are very complex and require a great deal of time. There are no standards for the determination of personnel in long-distance telephone exchange or repeater stations. The existing standards for the establishment of the personnel complement of postal enterprises do not reflect reality at all, since several postal operations have been simplified as a result of changes in postal rules and now require less time than that provided for in the standards.

The USSR Ministry of Communications is presently drawing up a draft of new standards for the determination of personnel complements in the GTS's, MTS's, telegraph offices, radio retransmission stations, radio centers, and district communications offices.

The draft of the new standards for the personnel complements of district communications offices provides an opportunity to calculate personnel complements in all categories of electrical communications workers: GTS, MTS, and VRS telephone operators, telegraph operators, workers in the wire-broadcast system, as well as the technicians who service exchange and line units, including those involved in labor-consuming jobs on routine repair and development in the fields of telecommunications and wire broadcasting. The draft of standards permits the calculation of personnel complements whether the telecommunications and wire-broadcasting facilities are attended jointly or seperately.

The draft offers standards for the fulfillment of both separate operations and groups of operations, and gives an account of how to calculate personnel complements; the latter does not mean that the calculation method will be uniform for all communications offices, inasmuch as the calculation must take local conditions into consideration and result in an organization of labor that will lead to the maximum possible reduction of labor costs.

Following is an example of a calculation of personnel complements for electrical communications and wire-broadcast facilities in a district communications office of Class V, prepared in accordance with the above draft.

The communications office contains the following:

1. Morse telegraphic equipment, which operates 24 hours a day. The average monthly telegraphic traffic over the basic link (district office — regional center), determined from Report f. 2 (receipt and transmission), is 2620 telegrams, of which 640 are received over the counter, 890 pass through the dispatch office, 946 represent transmissions per telephone with communications branches, the remainder being telegrams in transit.

2. GTS switchboard with a fitted capacity of 120 numbers, serving 118 subscribers. Three long-distance channels are connected to the switchboard. The average monthly long-distance traffic, according to Report f. 2, is 1360 conversations (incoming, outgoing, and transit).

3. Radio retransmission station TU-600, which operates 14.5 hours a day: from 6 AM to 2 PM and from 5:30 PM to midnight. The retransmission station has stand-by equipment available.

The types of equipment listed above are located in one area so that they can be attended jointly.

The calculation of labor costs for the servicing of the telecommunications and wire-broadcast system facilities must proceed from the size of the plant, traffic, times of operation, and conditions for joint (operational and technical) attendance of equipment.

In accordance with the draft of standards for the treatment of a telegraphic volume of 2620 telegrams and for the servicing of the switchboard, a staff of seven persons is necessary. This figure can be established through the following computations.

The expenditure of time on the processing of the telegraphic volume is determined in the following way. The telegraphic connection between the district office and the regional center is open around the clock, i.e., 24 x 30 = 720 apparatus-hours over a month; the volume of telegrams with communications branch offices is performed over the telephone during a period of 9 hours a day, i.e., 9 x x 30 = 270 apparatus-hours a month.

To determine the expenditure of time on the receipt and transmission of telegrams over the telegraph unit or th[e] telephone, we find the average number of telegrams per apparatus-hour:

2620:720 ≈ 3.6 telegrams, and 946:270 ≈ 3.5 telegrams.

We find in the draft of standards for personnel complements in district communications offices that a coefficient of 0.3 should be selected for the Morse unit and the telephone if the volume is 3-4 telegrams per apparatus-hour.

The expenditure of time on the processing of telegrams over a month is as follows:

on reception and transmission by means of Morse telegraphy — 720 x 0.3 = 216 man-hours; on the reception of telegrams over the counter — 640:16 = 40 man-hours; on the dispatch of telegrams — 890:25 ≈ 36 man-hours; on the exchange of telegrams with communications branch offices — 270 x 0.3 = 81 man-hours.

The total is 373 man-hours.

Proceeding further, we can establish that the number of telegraph operators needed is two (we divide 373 by 196, the number of working hours of one telegraph operator during an entire month).

The expenditure of labor (translated into man-hours) on the round-the-clock servicing of the GTS switchboard during a month is 720 man-hours. The number of working hours of a single GTS telephone operator during an entire month is 154, so that the number of necessary employees will be as follows: 720:154 ≈ 5. The expenditure of time on putting through long-distance calls is derived as follows: 1360:15 ≈ 91 man-hours. If the MTS channels are hooked up to the GTS switchboard, and if the GTS telephone operator plans her working day so as to put through the long-distance calls as efficiently as possible, then these expenditures of time need not be included in the calculation.

Seven persons are thus needed when the telegraphic equipment and GTS switchboard are attended jointly.

Four hundred sixty five man-hours, i.e., 2.5 employees, are necessary to attend to the equipment of a radio retransmission station that operates a total of 14.5 hours a day in two separate broadcasting periods, and that has stand-by equipment available, if the equipment of the radio retransmission station is not combined with the othe[r] means of electrical communication for purposes of joint attendance.

In order to apportion employees correctly over the various shifts, and to find out during which hours the telephone, telegraph, and radio retransmission equipment

may be jointly attended, we shall determine the expenditures of time in the various periods of the day. The expenditures of time during the hours of heaviest traffic are especially important to determine.

The average daily telegraphic volume on working days in the district communications office is 88 telegrams. Of these, 40 are in the first shift (between 8 AM and 2 PM), of which 14 are received over the counter, 16 pass through the dispatch office, and 10 are exchanged with the communications branch offices. The volume of telegrams during the second shift (between 2 PM and 10 PM) is 42, and in the third shift (between 10 PM and 8 AM) 6.

The expenditure of time on the processing of telegrams between 8 AM and 2 PM is as follows:

on receipt and transmission — 3 man-hours (40:6 ≈ ≈ 6.7 telegrams; with 6.7 telegrams per apparatus-hour, the coefficient is 0.5, hence 6 x 0.5 = 3 man-hours); on the receipt of telegrams over the counter — 0.9 man-hours (14:16 ≈ 0.9 man-hours); on the dispatch of telegrams — 0.7 man-hours (16:25 ≈ 0.7 man-hours); on the exchange of telegrams with communications branch offices — 1.5 man-hours (10:6 ≈ 1.7 telegrams; given this, the coefficient is 0.25, hence 6 x 0.25 = 1.5 man-hours).

The total that we obtain is 6.1 man-hours. Comparing the time determined according to the standards (6.1 man-hours) with the time expended in fact (6 man-hours), we find that one worker is needed for the processing of the telegraphic volume indicated above.

The study of the number of calls reaching the GTS switchboard during the hours of heaviest traffic — between 9 AM and 6 PM — has shown that a GTS telephone operator handles up to 2750 calls during these nine hours. Hence, the expenditure of time on attending to the switchboard during the hours of heaviest traffic is 2750:550 = 5 man-hours, where 2750 is the number of calls and 550 is the standard for the calculation of the personnel complement.

Forty eight calls pass along the MTS channels linked up with the GTS switchboard during 24 hours, including 34 calls between 9 AM and 6 PM, 10 calls between 6 PM and 10 PM, and 4 calls between 10 PM and 9 AM.

The expenditure of time on putting through long-distance calls is 34:15 = 2.3 man-hours, where 34 is the number of long-distance calls and 15 is the standard.

The total expenditure of time on work on the GTS switchboard and on attending to the long-distance calls between 9 AM and 6 PM, as determined according to the standards, is 5 + 2.3 = 7.3 man-hours, while 9 man-hours are expended in fact.

The expenditures of time in man-hours, as determined by similar methods, are as follows: for telegraphic exchange between 2 PM and 10 PM (receipt, transmission, over the counter, dispatch) — 7.7 man-hours; for attending to the GTS switchboard between 6 PM and 10 PM — 1.2 man-hours (660:550 = 1.2, where 660 is the number of calls and 550 is the standard); long-distance calls — 0.7 man-hours (10:15 ≈ 0.7, where 10 is the number of calls and 15 is the standard). The total is 9.6 man-hours.

It has thus been established, by means of the standards, that 9.6 man-hours are needed for attending to the GTS switchboard and the telegraphic equipment, while 12 man-hours are expended in fact on these operations. Consequently, the workers are not fully engaged in productive labor and can be shifted to other work.

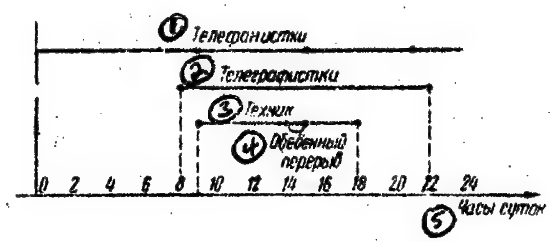
The expenditure of time on attending to the GTS switchboard and the telegraphic equipment between 10 PM and 8 AM is 3.4 man-hours, according to the standards, while the night shift is 10 hours. Therefore, during this time of night and early morning, the switchboard and telegraphic equipment should be entrusted to a single employee. Even so, this single employee may not have a full load of work.

In order to arrange the night shift most efficiently and to effect a saving in personnel, the radio-retransmission station should be entrusted to the telephone operator or telegraph operator during the hours of lightest traffic: between 6 AM and 9 AM and between 6 PM and midnight on working days, i.e., 9 hours, and during the entire broadcasting period, i.e., 14.5 hours on Saturdays and days before holidays. A technician attends to the radio-retransmission station during the hours when the telephone operator or telegraph operator is wholly occupied with her basic job.

According to the standards, 6 man-hours are required each month for the technical servicing of Morse telegraphic equipment, 2 x 11.8 = 23.6 man-hours for the GTS switchboard, and 32 man-hours for the radio-retransmission station equipment. The total is 61.6 man-hours. These figures are not included in the total expenditures of time because the technician can conduct a preventive inspection of the Morse telegraphic equipment, GTS switchboard, and the radio-retransmission station equipment while he is on night duty at the radio-retransmission station.

The graph on the following page indicates the man-hours necessary when the GTS switchboard, telegraphic equipment, and radio-retransmission station are attended jointly. As can be seen from the graph, the following amounts of man-hours are needed for round-the-clock servicing of the means of electrical communications and the wire-

broadcast system during working days (26 days in the month): for telephone operators — 24 man-hours, for telegraph operators — 14 man-hours, for technicians — 8 man-hours, in all 46 man-hours.



1) Telephone operators; 2) telegraph operators; 3) technician; 4) lunch break; 5) hours of the day.

For joint servicing of these facilities on Saturday (four days in the month), the following amounts of man-hours are needed: for telephone operators — 24, for telegraph operators — 8, in all 32. The total number of man-hours in the month is as follows: 46 x 26 + 32 x 4 = 1324 man-hours. With allowance for vacations (4% of the total) — 53 man-hours — the total is 1377 man-hours.

Four telephone operators are needed for round-the-clock service on the switchboard. The monthly total of working hours of a single GTS telephone operator is 154, so that the expenditure of time on the part of four telephone operators during a single month is 154 x 4 = 616 man-hours; the working time of a single technician is 196 man-hours. The telegraph operators work the remaining 565 man-hours (1377 — 616 — 196 = 565). Hence, three telegraph operators are needed (565:196 ≈ 3). Two telegraph operators work in shifts, while the third replaces the telegraph operator or telephone operator on Saturdays and days before holidays. One of the seven workers is designated as the senior employee.

Given the proposed arrangement of the work force for the servicing of the telecommunications and wire-broadcasting facilities listed above, eight employees are necessary (four telephone operators, three telegraph operators, and one technician).

The number of telegraph delivery boys can be determined from the number of telegrams delivered by a single telegraph boy in one hour, a figure which can be determined by means of a time study of the working day of the telegraph boy. It was established, in this instance, that the

telegraph boy delivers three telegrams an hour, i.e., 3 x x 196 = 588 telegrams in a month. To deliver 890 incoming telegrams, therefore, the number of telegraph boys needed is as follows: 890:588 = 1.5. In view of the fact that telegrams should be delivered over a period of 16 hours in the day, the required number of telegraph boys is two.

The monthly expenditure of labor on technical servicing of GTS, VRS, and rural wire-broadcasting facilities is calculated for the district as a whole, with due consideration being given to joint attendance to equipment. In this connection, note should be taken of the expenditure of labor on routine repair to pole-strung aerial lines and on certain work in development. As a matter of convenience, we have gathered the data in the table on the following page.

Thus, 1309.4 + 6.7 + 116 + 50 ≈ 1482 man-hours are expended on the technical servicing and everyday repair of outside plants, including certain work in development.

We allow for a reserve of 75 man-hours to allow for the replacement of line inspectors during regular and extra vacations (some workers have a vacation equivalent to 12 working days, while others have a vacation equivalent to 18 working days). The figure then becomes 1557 man-hours. We find the number of employees needed by dividing the total number of man-hours by the average monthly standard for a single worker's working time: 1557:196 ≈ 8.

Two technicians are required to direct the work of the eight line inspectors, since one technician is needed for every four or five inspectors.

Thus, if labor is correctly organized, a Class V communications office will need 18 employees.

As can be seen from the foregoing computations, joint attendance can permit a significant saving in the work force. The discovery of reserves of work force is of particular importance at the present moment, when the question of a transition to a seven-hour working day is posed.

In case the various types of communications equipment listed above are located in various places and are serviced separately, the following personnel complements are necessary in accordance with the standards: for round-the-clock telegraph service — 4; for attending the GTS switchboard and MTS channels — 5; the radio-retransmission station — 2.5; for the technical servicing of the GTS switchboard and the telegraphic equipment — 0.2; for the technical servicing of outside plants and subscribers' points — 10; a total of 22 employees.

As can be seen from the foregoing computations, four more employees are needed with separate attendance than with joint attendance.

No.	Plant nomenclature	Plant volume	Personnel complement standard in man-hours	Total man-hours per month
1	VRS and GTS pole-strung aerial lines	152 km	2.6	395.2
2	VRS circuits strung on Line Telephone Administration (LTU) poles	20 km	1.3	26
3	Cable (underground, underwater)	1.2 km	0.8	1
4	Cable boxes	10	0.2	2
5	Dial telephones	2	8	16
6	GTS and VRS subscribers' stations	156	0.4	62.4
7	Rural radio pole-strung overhead lines	180 km	3.8	684
8	Rural radio circuits strung on VRS poles	4 km	4.2	16.8
9	Radio loudspeakers	2650	0.04	106
	Total			1309.4
10	Installation of telephones per year	16	5	80:12 = 6.7*
11	Routine repair per year	232 km	6	1396:12 = 116*
12	Installation of loudspeakers per year	200	3	600:12 = 50*

*The figure is divided by 12 because the number of man-hours under Items 10, 11, and 12 is reckoned on a yearly basis.

Another article will discuss the expenditure of labor in case a single worker performs postal operations and simultaneously attends to communications and radio-broadcasting equipment.

M.K. LOBOVA, Senior Engineer of the Moscow Regional Communications Administration

In the Collegium of the
USSR Ministry of Communications

IMPROVE THE SUPPLY OF TOOLS AND LINEMEN'S EQUIPMENT TO COMMUNICATIONS ENTERPRISES

The Collegium of the USSR Ministry of Communications has discussed the problem of the production of tools and linemen's equipment for communications enterprises. A report on this topic was provided the session of the Collegium by Comrade Kolontayev, Director of the Yur'yev-Pol'skiy Factory of the Ministry of Communications, the basic supplier of these products.

In recent years, the factories and plants of the Administration of Industrial Enterprises (UPP) of the USSR Ministry of Communications have significantly increased the production of tools and linemen's equipment. In 1957, 50,000 pairs of linemen's climbers, 12,000 sets of tongs, 8000 blow torches, and a considerable number of office tools were produced. New items have been put into production: tools with insulated handles, lighter climbers, universal pliers, and several others, including those proposed by Comrades Sheykin, Smurov, and Priyma, the efficiency experts. However, as was noted at the session of the Collegium, several of the tools are being produced in inadequate quantities, and operational and construction workers have serious doubts concerning the quality of the products. For example, Comrade Asoyan, the Director of the Moscow City Administration of Radio-Retransmission Networks, remarked that the drills received from industry do not always fulfill the requirements, and that there had been instances of tools with inadequate insulation of the metallic parts. Comrade Ravich, Director of the Main Administration of the Long-Distance Telephone System, called the attention of the Collegium to the fact that the linemen's belts produced by the Moscow Factory of the Administration of Industrial Enterprises are too heavy and can be significantly lightened and improved without any decrease in the safety of line operations. Comrade Dubinin of the Moscow Office of Glavsnab (Main Supply Administration) criticized workers in industry for the irregular shipment of tools to the regional communications administrations.

Comrade Sergeychuk, Deputy USSR Minister of Communications, emphasized the necessity of educating the workers systematically in the spirit of a careful attitude toward tools and equipment.

Comrade Arutyunov of the UPP of the USSR Ministry of Communications, Comrade Abramov of the Moscow Regional Communications Administration, Comrade Grigor'yev of the TsK (Central Committee) of the Trade Union, Comrade Pominov of the Moscow City Telephone Exchange, Comrade Rezvyakov of the City Telephone Exchange Section of the USSR Ministry of Communications, and Comrade Gusev of the Moscow Factory of the Administration of Industrial Enterprises also spoke at the session of the Collegium.

Comrade Psurtsev, USSR Minister of Communications, spoke at the conclusion of the session. He pointed out that there was every possibility to satisfy in full the needs of communications agencies for tools and linemen's equipment and to improve the quality of these products in accordance with requirements.

The Collegium of the USSR Ministry of Communications adopted a resolution to undertake a series of measures to solve this problem in the briefest possible time.

ORGANIZATION AND EXPLOITATION OF COMMUNICATIONS MEDIA

TO COMPLETE THE RADIOFICATION OF UKRAINE VILLAGES

The Party and Government have set a very important problem before the communications workers - the completion of the radiofication of rural areas by the end of 1959. In order that the people of rural populated points of our republic have the possibility of listening to radio in their own homes by this date, it is necessary, during the next two years, to install about two million radio points and a million radio receivers in the Ukraine.

In this connection, it will require installing up to 260 thousand km of aerial and underground-cable lines, equipping and reconstructing 427 kolkhoz and 496 Ministry of Communications rediffusion stations and equipping 750 power bases. It will also be necessary to put the existing kolkhoz rediffusion stations and lines into proper technical condition.

During eleven months of last year, radiofication work was done in the Ukraine SSR in the total amount of 85.4 million rubles, including 72 million rubles for kolkhoz. More than 32 thousand km of aerial and underground cable radio-relay lines were installed, 213 kolkhoz rediffusion stations were built and reconstructed, 150 Ministry of Communications rediffusion stations were reconstructed and 656 thousand radio points were installed, including 513 thousand in rural areas.

The question of the state of radiofication in the Ukraine SSR was discussed at a republic conference at Nikolayev in September, 1957. Representatives of the oblasts told how the 1957 plan for the radiofication of rural areas was being fulfilled and they shared their experiences in utilizing the assigned material funds and the mobilization of inner resources.

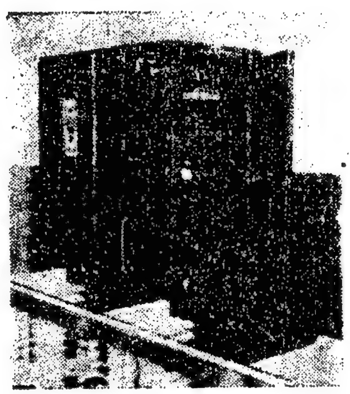
The best results in fulfilling the annual plan were obtained by the communications workers of the Nikolayev, Kherson, Krym, Dnepropetrovsk, Sumy, Cherkassi, Vinnitsa oblasts and a number of other oblasts.

Here, radioficators have worked on the liquidation of parallel rayon communications service (VRS) lines which frees a great number of poles which are entirely satisfactory for line construction. In these oblasts, the use of suspension of radio relay feeders on VRS poles has been more widely adopted.

However, in the Kharkov, Zhitomir, Zaporozh'ye oblasts and several other oblasts of the republic, these possibilities are very often not recognized or are deliberately overlooked. But our reserves are still very great. For example, consolidation of main and VRS lines on the L'vov-Brody section (in the L'vov oblast), only 100 km long, permitted releasing about 4000 poles for radiofication line construction. In the Kiev oblast, up to 3000 poles were similarly freed and in the Rovno oblast, more than 2000 poles were released.

The completion of the radiofication of rural areas demands the mobilization of inner resources not only in line construction, but also in station construction. It is necessary to close down small, unprofitable rediffusion stations more energetically, and to use the freed apparatus for the radiofication of populated points for which, due to insufficient line material, it was impossible to construct feeder radio lines. An example of this was shown by communications workers of the L'vov oblast. Here, in 1957, unprofitable rediffusion stations of the Ministry of Communications in rayon centers Krasnoye and Novyy Milyatin, and kolkhoz rediffusion stations in the villages of Domashev in the Rava-Russkiy rayon and Skvarzhava in the Krashenskiy rayon were closed down. The relay networks of these stations were connected to the neighboring rediffusion stations which permitted more effective utilization of the existing capacity of active rediffusion stations, freeing rediffusion station equipment with a total capacity of up to 4 kw, and using it for the radiofication of villages to which, for this reason or other reasons, it was impossible to supply radio lines.

Service consolidation of electrical communication and rediffusion station facilities at the Busskiy interrayon rediffusion station in the L'vov oblast.



Transformer substation built by the workers of the L'vov DRTS

Now similar steps are planned for the Nikolayev oblast and several other oblasts in the Ukraine.

At the beginning of last year, at the republic conference of agricultural workers, there was discussed the January 17th, 1957 appeal of the CC of the CPSU and the Council of Ministers of the USSR to village workers, party, labor union and communist youth organizations, to soviet and agricultural economy organs, specialists and all agricultural economy workers, in which the Party and the Government called on party, soviet, labor union and communist youth organizations to devote great attention to political and cultural-mass work in kolkhoz, MTS (Machine and Tractor Service Station) and sovkhoz, and included a recommendation for wider radiofication of villages. A. I. Kirichenko, the First Secretary of the CC of the CP of the Ukraine came forward at the conference and demanded of party and soviet organizations the fulfillment of Party and Government directives for completing the radiofication of rural areas on time in 1959. After this speech by Comrade Kirichenko, the question of the radiofication of rural areas was discussed oftener at the meetings of the Executive Committees of Oblast Soviets of Workers' Deputies and at the Bureau of Oblast Committees of the CP of the Ukraine.

Now communications workers receive great help from Party and Soviet organizations in a number of oblasts. Thus the Nikolayev CP of the Ukraine and the Oblast Executive Committee adopted a joint resolution in June of last year on the basis of which 10 thousand m^3 of poles for the radiofication of the oblast villages were assigned. This same resolution obligated the Oblpotrebsoyuz ("Oblast Consumer Association") to assign cement and metal for reinforced concrete poles and attachments. Two contruction trusts in the city of Nikolayev, which have reinforced concrete products plants, were charged with their manufacture. Up to the end of 1957, these trusts furnished to radioficators over 20 thousand reinforced concrete attachments. Aside from that, the "Oblpotrebsoyuz" is releasing part of the steel wires brought into the oblast for radiofication purposes.

The Volyn' Oblast Committee of the CP of the Ukraine and the Oblast Executive Committee decided to assign 46 thousand telegraph poles for the radiofication of villages from oblast funds. The Sumy Oblast Committee of the CP of the Ukraine and the Oblast Executive Committee aided communications workers in manufacturing, at oblast enterprises, more than 2000 eight-pin crossarms of local lumber which will be required in connection with the liquidation of parallel communications lines.

With the help of the City Party Committee, the L'vov Radio Relay Network Board and Construction-Assembly Radiofication Administration acquired two automobiles, GAZ-67, each.

The mobilization of inner resources and the proper utilization of material funds assigned by local Party and Soviet organizations create favorable conditions for the completion of the radiofication of rural areas in the Ukraine within the next two years. However, it would be erroneous to assume that complete radiofication of the Ukraine villages can be accomplished during this period without decisive improvement in planning and supplying materials. For a number of years, funds for basic line materials allowed to the Ministry of Communications of the Ukraine SSR have far from met the actual requirements. The supply organs of the Gosplan of the USSR and the Gosplan of the Ukraine SSR, up to this time, have failed to grasp the situation in planning centralized material funds for the volume of construction and repair work which they themselves also planned. Thus, for example, according to the plan for work volume approved for 1957 by the Ministry of Communications of the Ukraine SSR, 6.68 million insulators were required, but the Gosplan of the Ukraine SSR furnished only 4.5 million pieces. 8445 tons of telegraph wire were required, but the Gosplan of the USSR furnished only 7000 tons. 175 thousand m^3 of telegraph poles were needed - only 133 thousand m^3 were furnished. 26.3 thousand km of PRVPM cable were required - 23.5 thousand km were furnished. Such a state of planning threatens a breakdown in the fulfillment of state plans for construction and repair work of the radiofication and communications economy of the republic.

The situation is aggravated in that suppliers of these materials systematically disrupt their shipments. Thus, during seven months of last year, the Ukraine received only 50% of the assigned number of telegraph poles and slightly over 60% of TF-3 insulators. For seven months the shipping schedule of telegraph poles was disrupted by suppliers Arkhlesosbyt [Arkhangel'sk Lumber Marketing (?) Organization], Karellesosbyt [Karelian Lumber Marketing (?) Organization] and others, and the shipment of insulators by the Olevskiy porcelain factory which is subordinate to the Kiev sovnarkhoz was disrupted. One of the Dnepropetrovsk sovnarkhoz factories rudely disrupted the assortment of telegraph wire and the rate of its shipment.

Due to the fact that the suppliers have not furnished the planned quantity of basic line materials - poles, wire and insulators - to the Ukraine SSR communications organizations, the nine-month plan for the radiofication, as a whole, of the Ukraine was only 96% fulfilled. The Ministry of Communications of the Ukraine SSR and local communications organizations took all the measures available to them to influence the suppliers, but to no avail.

The necessity of completing the full radiofication of Ukraine villages by the end of 1959 demands not only more intensive work from communications men of the republic, and the strengthening of supervision and possible aid on the part of local Party and Soviet organizations. It also demands that corresponding branches of the Gosplan of the Ukraine SSR make material fund plans with a better understanding of the business and with a feeling of direct responsibility for the fulfillment of this most important state and political problem.

I. T. Kirichenko, Minister of Communications of the Ukraine SSR.

OUR EXPERIENCE IN SERVICING CABLE INSTALLATIONS WITHIN THE CITY TELEPHONE SYSTEM

The most important task facing telephone exchange workers is to maintain cable plant and terminal cable equipment in excellent technical condition. To this end, the Leningrad GTS is doing systematic reconstruction and capital repair work on line plants in addition to preventive maintenance. In this connection, the distribution heads and 10-pair boxes have been transferred to ladder networks (42% of the distribution heads and 92% of the 10-pair boxes have been installed in ladder networks in our exchange), cables have been laid under air pressure, overhead lines have been replaced with underground cables, and cables have been shielded against electrical or chemical corrosion, etc.

These measures have improved the technical condition of the cable plant, have led to a reduction in the amount of damage, and have also made cable inspection easier, creating favorable conditions for changes in the organization of the labor of the inspectors. In the reorganization of the work of the inspectors (cable splicers), the aim was to expand the segment of plant service by the inspectors, to reduce the length of time necessary for the elimination of cable damage, to stop the unproductive waste of time on transfers from one place to another, and to ensure effective control over the work of the inspectors on the part of the technicians.

These requirements are satisfied by the separate team method of inspection work which was introduced in January, 1956, in the cable department of the Central Telephone unit of our GTS. Previously, the cable network of the Central Telephone unit had been divided into four technical districts; each technical district had been further divided into sectors (there were 24 sectors in the whole exchange); the team of cable splicers worked in each of these sectors, servicing 9-10 cable-box districts. Under the circumstances, the inspectors were frequently transferred from one task to another in the course of a single day. This procedure prevented them from concentrating on any particular job, a situation reflected in the results of their labor and in the enormous losses of time in transit. Furthermore, it was difficult to locate a given inspector at any particular moment, i.e., there was no opportunity to control his work.

With the introduction of the separate team method, the maintenance of the cable plant of the Central Telephone

unit is performed in the following way.

Cable plant maintenance work is divided between two groups of inspectors; one group is concerned only with planned preventive maintenance (routine repairs), while the other group is concerned with repairing damage. All cable plants are divided into four technical districts, each of which is directed by a cable technician who bears full responsibility for the faultless maintenance of the cables in his district. Four or five teams of splicers are under the jurisdiction of the district technician, of which two teams — the repairmen — are concerned with repairing damage in the technical district, while the other three teams are concerned only with preventive maintenance.

Fifty percent of the plant of the technical district, i.e., approximately 30-35 cable box districts with all overhead and underground cable plant and terminal equipment, is alloted to each repair team. Each team is responsible for the duration, and for the elimination within the established deadlines of the cable damage originating in its sector.

The inspector teams concerned with preventive maintenance are joined at the technical-district level in a general group (consolidated team) and perform preventive maintenance and routine repairs in the cable box districts and on underground cable plant under the leadership of a technician and in accordance with the duty chart. These teams bear the responsibility for the quality of repairs and for the amount of damage within their technical district.

Work on preventive maintenance is carried out the year round, while routine repairs to overhead cables (distribution cables) are performed during the period between November and April, and the underground cable plant is repaired during the summer. The work chart for routine repairs to underground cable plants is drawn up in such a way that cable work in the manholes will be carried out immediately after routine repairs to the manholes are carried out.

The daily workload of the inspectors concerned with preventive maintenance is determined by the volume of every day work arising out of the yearly and monthly work charts for routine repairs (preventive maintenance) to the cable network of each technical sector. Upon the instructions of the technician, these inspectors examine and fortify cables on the walls of houses; lay and clean cables in the manholes and boxes; replace segments of distribution cables which have fallen into disrepair; examine, clean and fortify 10-pair distribution boxes; put the distribution heads in

order; repair damaged pairs; and make sure that the cable insulation resistance standards are being met.

The workload of the repairmen depends chiefly on the amount of incidental cable damage. If there is little or no cable damage, the repairmen carry out various instructions from the technician: they replace the inspectors concerned with preventive maintenance who are on vacation or sick leave, and they make the rounds of the sector (with the help of specially designated workers) in order to control the earthwork of other departments, etc.

The introduction of the separate team method of inspection work in servicing the cable plant of our exchange has significantly boosted labor productivity and has increased the qualitative indexes; the new method has led to an improvement in the control over the work of the inspectors and has also permitted preventive maintenance to be carried out strictly according to the work chart. In addition, the district technician has the opportunity to rearrange his work force (in case of illness or workers' vacations) without detriment to production, if the whole collective of cable workers in the technical district and the technician are concerned with the achievement of high-quality indexes in their district.

Two years of experience in the separate method at the Central Telephone unit . in our exchange has shown its vitality and advisability.

Index nomenclature	1956	1957	Technical district
Average duration of cable damage (in hours)	10.3 11.1 10.6 11.1	6.8 7.1 7.5 6.8	1-st 2-nd 3-rd 4-th
Percentage of cable damage	0.5 0.5 0.5 0.4	0.4 0.26 0.33 0.3	1-st 2-nd 3-rd 4-th

Over these two years, as can be seen from the table, the technical condition of the cable plant has significantly improved.

Ye.L. KOGAN, Director of the Outside Plant Division of the Leningrad GTS Administration

WE MUST RAISE THE LEVEL OF SKILL AMONG SUPERVISORS OF BRANCH COMMUNICATIONS OFFICES

One of the basic factors responsible for many of the shortcomings existing in the operations of communications organizations is the fact that regional communications administrations are failing to devote adequate attention to the problems of providing adequately trained specialists for branch communications offices, and this is particularly true of those offices located in rural areas.

Within the territorial limits of the RSFSR, at the present time, there are more than 32,000 branch communications offices. It should be pointed out that the supervisory staff at these enterprises reflects a singularly nonuniform level of education and operational experience. Recent graduates of trade and technical schools, secondary schools, and pedagogical institutes, upon completion of their schooling joined communications organizations and are now fulfilling the duties of supervisors at branch communications offices along with the old-time production workers.

This implies that a substantial part of management personnel at branch communications offices is in need of raising its level of production training. The fact that rural communications enterprises are being provided with new equipment, and considering the fact that telephones and wire broadcast facilities are being extended to rural areas on an ever increasing scale, also points up the need to raise the level of knowledge among supervisors at branch communications offices. In recent times, there has been a substantial increase in the demands made upon communications organizations.

In order to train supervisors for branch communications offices and to raise their level of skill, permanent interregional courses have been set up within the RSFSR, said courses being given at 35 regional communications administrations, with a training period lasting three months. The individuals participating in these courses must be absent from their work during the three months. The enrollment in these courses covers 2,345 people. During the past two and a half years, 6,070 workers received training in these courses organized at the regional communications administrations of the RSFSR. Of the graduates from these courses, 1,350 individuals were assigned to more responsible positions than they had held earlier.

The RSFSR Ministry of Communications checked on the

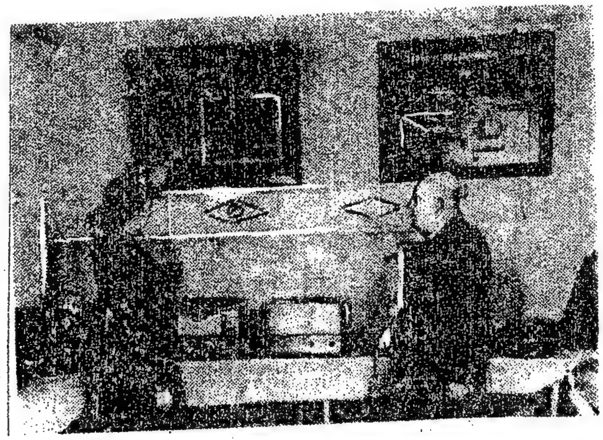
training being given by the permanent interregional courses at the Bashkir, Perm, Pskov, Saratov, Sverdlovsk, and Tomsk Communications Administrations. In addition, a meeting was convened among those individuals in charge of courses and of workers responsible for the training of specialists and personnel for regional administrations which are responsible for the administration of these courses. The data produced by the inspections and the statements made by participants at the above-mentioned meeting indicate that communications workers with adequate theoretical training and production experience have been invited to lecture at almost all courses. Whenever a communications administration exhibits true concern for the establishment of the necessary prior conditions for the normal progress of the courses, we find that the lectures are held in well equipped buildings, and that the courses have the necessary textbooks and visual aids at their disposal, in addition to a technical consultation room, a library (Kirov, Ivanovo, Tambov, Stavropol', and other communications administrations).

Nevertheless, the inspection showed that at a number of communications administrations the problems of training supervisory personnel for branch communications offices, and raising their level of skills, is not being given adequate attention. For example, the teaching facilities available to many of the courses were found to be neglected. Not enought literature, visual aids, models, diagrams, and other training materials are kept available. Technical consultation rooms have been set up for the courses at nine, while libraries have been set up for the courses at twelve, communications administrations. Many of the dormitories for those participating in these courses are not adequately equipped. In particular, the Bashkir, Tyumen, Pskov, Tomsk, Kaliningrad and certain other communications administrations, have failed to provide for normal social activities.

The inspection showed that a number of communications administrations — Altay, Tomsk, Severo-Osetinsk, Dagestan, and others — failed to observe the required background qualifications in selecting candidates to attend these courses (the established length of service on the job and the level of general education).

There are also serious shortcomings in the job assignments for the students, once they have completed their courses. It was established that more than 1,500 individuals (of those having completed courses) were assigned to work outside of their skills — as telephone operators, letter carriers, etc.

The directors of regional administrations and district communications offices are not devoting adequate at-



In the technical consultation room set up for interregional courses for supervisors of branch communications offices in the City of Kirov; here the participants carry out assignments in the field of electrical engineering: at the left, an outstanding student, Comrade Shchelchkova; at the right, an instructor, Comrade Salikov.

One of the dormitory rooms provided in the city of Kirov for participants in the interregional courses for supervisors of branch communications offices.

tention to the problem of training branch-communications-office supervisors in the various aspects of their activities, through the facilities offered by the All-Union Com-

bine of Correspondence Schools. Here, in 1956, 1,700 supervisors of branch communications offices in the Russian Federation underwent training, while only 1,100 individuals were able to complete the course. Correspondence training has been particularly unsatisfactory in the Perm, Pskov, Novosibirsk, Stalingrad, Sakhalin, Komi, and Mariy Communications Administrations.

In order to eliminate the shortcomings existing in the training of managers for branch communications offices and directors of regional communications administrations, and above all, for the training of the latters' assistants, we must devote our constant attention to the problems of improving the qualifications of supervisors of branch communications offices, not turning this important matter over to the individuals responsible for conducting the training courses, nor to the workers responsible for the training of specialists at regional communications administrations.

V.V. ALEKSANDROV, Director of the Administration for Management Personnel, RSFSR Ministry of Communications.

MAIL DELIVERY ON INTRADISTRICT ROUTES

Over the course of the past two or three years, the Regional Communications Administration has devoted serious attention to improvement of delivery of mail and the press on intra- and interdistrict routes.

From 1955 to 1957, having utilized internal resourc we put into service, in the capacity of departmental transport, 150 km of interdistrict and intradistrict motor route (while releasing rented cart transport), and increased the length of the motor routes to 200 km. At the present all 26 districts and all branch communications offices of the district, as well as 813 villages and cities out of the 915 populated areas in the region, receive their mail and both the republic and the Moscow newspapers on the day that the mail is received in the regional center; the regional newspaper is received on the same day it comes off the pres

In 1957 the communications administration, working with centralized procedure, provided all communications offices with light easy to handle two-wheel carts; these were paid for out of funds received from auxiliary communications services. One horse is harnessed to the cart; this made possible the release of some of the horses, since mail was previously drawn to branch communications offices by heavy four-wheel traps; two horses were needed to pull these traps and, as a matter of fact, there was not a great deal of mail. These traps are now used on routes on whic are located two or more branch communications offices.

As a result of the measures that have been taken, 20-30% of the collective-farm transport has been released in each communications office.

In two districts, as an experiment, we used motorcycles to carry out mail traffic with branch communications offices.

The Regional Administration put a "Minsk" model motorcycle at the disposal of the Turkov Communications Of-

fice so that they could be used there to transport mail to the branch communications offices located in Limna and Il'inka. The communications workers of the office, with the participation of the office Supervisor L.N. Zaikin, designed a trailer carriage for this motorcycle (see photo). The frame for the carriage was made from rear forks of bicycles. The front part of a bicycle frame served as the trailer. The carriage body was made from plywood and bound with sheet metal. The body was attached to the motorcycle by means of of springs. Experience has shown that this carriage can transport loads weighing up to 100 kg. The delivery of mail by motorcycle to branch communications offices located in the populated areas of Limna and Il'inka takes one-third the time of delivery by horses. Therefore the need for rented cart transport has decreased greatly in one Turkov branch alone. The motorcycle is driven by the escort himself, who has the right to drive vehicles. By using motorcycles, the Turkov Communications Office has a yearly saving of about 5,000 rubles. In addition, delivery of mail and of the press has been speeded up by 24 hrs. Now the mail is delivered in all branch communications offices on the day it is received in the district office.

Excellent measures were also taken in the Zhidachovsk Communications Office, where motorcycles are used to convey mail to two branch communications offices; this also made possible a one-day speedup in mail transport.

It would have been possible to put other motor routes into service through the use of motorcycles. Utilizing local reserves, however, the Regional Communications Administration is not able to provide all communications offices with motorcycles. The USSR Ministry of Communications should aid us in this important work.

P.I. LYSYKh, Deputy Supervisor of the Drogobych Regional Communications Administration

A DESERVED REWARD

N.D. Psurtsev, Minister of Communications of the USSR, has recently commended the collective staff of the Il'inskiy Branch Communications Office of the Ramenskoye District, Moscow Region, for their fine work.

The communications workers of this leading branch have attained a high standard of public service and are fulfilling all plan and operational quotas.

The Minister has expressed his thanks to the Il'inskiy collective staff for the progress they have made. The best workers, N.D. Petrova, the branch Supervisor, M.D. Trofimova, her assistant, telephone operator O.P. Gritskova and telegram deliverer A.A. Rubtsov, were cited.

AN EXEMPLARY BRANCH COMMUNICATIONS OFFICE

The Il'inskiy settlement is situated in the picturesque Moscow suburban area. Its population is numbered at 25,000, and during the summer season this number doubles.

In order to improve service to the population it was decided to open a branch communications office in Il'inskiy. A large plot of land was set aside for this purpose in the center of the city. There was formerly a wooden house on this site which served as a dormitory for the technical school. This house was in a state of neglect. The land was cluttered and was quite unattractive.

N.D. Petrova, an experienced communications worker, was entrusted with the job of organizing the new branch communications office. Together with her assistant, M.D. Trofimova, she took up this job avidly. It was necessary to clear off the land and make major repairs on the house. They had many difficulties to overcome. But within a short space of time the building was made suitable for use as a branch

communications office and the land was cleared successfully.

And thus the branch communications office was opened. At the onset, it was a small IV-class enterprise with a total staff of two persons. The volume of work was not great, but it steadily increased from year to year. By now the Il'inskiy Branch Communications Office has already become a I-class enterprise. It has a staff of 25 workers and provides for postal, telegraph, and telephone services. The office is furnished with ST-35 telegraph equipment, a 100-number capacity telephone station and a direct telephone connection to Moscow, making it possible to speak to any city in the Soviet Union. There are two convenient booths for phone conversations.

The Il'inskiy Branch Communications Office is one of the finest in the Moscow region. It is distinguished among any other communications enterprises by its fine appearance and the high quality of its public services.

The branch building is decorated so tastefully that it attracts attention from far around. During the summer it is buried in flowers. The workers of the office did a great deal of work in planting their premises with greenery. As a result, 250 bushes of dahlia, phlox, and other flowers have been planted. Clusters of flowers are scattered in front of the building. In 1957 the collective staff of Il'inskiy communications workers was given a I-st class award at the district gardening exhibition by the Ramenskoy branch of the All-Russian Society for Preservation of Nature and Planting in Populated Areas. Upon entering the branch communications office, you come upon a small, but very cozy, business office. Provided her for the clientele are tidy desks, on which, under a glass, lie public announcements concerning various communications services. Also lying on the desks are electric lamps with silk shades, ink wells, pen holders, blotters, and sponges with water. Behind glass windows are the working places of the postal agents.

There is immaculate order everywhere — in the business office, in the rooms where the telephone booths and switchboard and telegraph equipment are housed, in the terminal room and in all workers places. This is the daily concern of the whole collective staff. In the windows, on the walls, on the floor — everywhere greenery: roses, ficus, palms.

For the convenience of the clientele, there is a separate entrance to the room where parcels are received and given out.

A visitor to the branch communications office can receive an answer to any question concerning communications services that interests him. There is no need to ask some-

The business office of the branch communications office.

one for information. There are public notices everywhere, clearly bringing attention to the communications services provided by the branch communications office and explaining how these services are to be used. These notices are in metal-rimmed frames which are made to order.

All parts of the office are provided with special production furniture, obtained by Comrade Petrova at a factory of Taldom. The floors are linoleum covered and set with strips of carpet.

Electric clocks have been installed at the entrace to the branch communications office, in the business office, at the working places of telephone and telegraph operators and in the delivery department.

A business-like attitude is felt in all aspects of the work – concern about the creation of greater convenience for the clientele as well as a striving to improve the labor conditions of the workers. In one of the rooms there is an enamel pot with boiled water standing on a small table, as well as an earthen ware washstand with a mirror, towel and soap.

But we are not only concerned with the external aspect, with the pleasant surroundings created at the enterprise. The workers of the office give each client special attention and strive to satisfy his demands completely. The exemplary of this type of work are postal agents V.I. Kiseleva, E.A. Konova and others.

Postal agents advise clients how to make up mail according to content. This advice is followed willingly, and therefore the branch communications office accepts and dispatches a large amount of registered letters, airmail letters and printed matter. As a rule, parcels are accepted with information as to delivery or with a declared value. The majority of parcels are delivered home. It sometimes happens that a parcel brought into the branch communications office for dispatching is not done up in accordance with the requirements of the postal rules. A postal agent is right there to render aid, and the shortcomings are eliminated.

Auxiliary services in wrapping parcels, printed matter etc. are offered to the client if he is in need of this type of aid. Funds received from these services are used for improving the labor and recreational facilities of the workers. In this way a "Ural" radio receiver with record player, a rug, carpets and other articles were obtained. During 1957, the sum received from the rendering of auxiliary services was 4581 rubles; the plan prescribed 4 thousand rubles.

N.D. Petrova, the Supervisor of the branch communications office, conducts a conference with her workers. In the picture (from left to right): M.D. Trofimova, assistant to the Supervisor, N.D. Petrova, V.I. Kiseleva, Senior Postal Agent, V.D. Umyvalkina, letter carrier, V.V. Pakhomova, team leader of the letter carriers, G.V. Malysheva, telephone operator, N.N. Zhuravleva, delivery inspector.

Comrade Petrova, the Supervisor of the branch communications office, is very persistent in acquiring picture post cards. There is a large assortment of these cards, among them a special set of 23 cards with flowers depicted upon them. Various picture post cards, envelopes and recently issued postal stamps are available at each working place; this furthers the fulfillment of the revenue plan.

The postal agents who accept money orders, insured, airmail and registered letters and parcels, always bring to the attention of the sendee the fact that picture cards and envelopes can be used. There is a rotating display stand in the business office, on which are shown samples of the picture post cards which can be obtained in the branch communications office.

The Supervisor of the branch communications office does not forget about children. For children of various ages postal agents have special post cards with and without stamps, as well as a selection of different colored drawings and pictures etc. Therefore it is not accidental that one can often meet schoolboys and small children, who have come with their parents, in the branch communications office. The children know the workers of the branch communications office and, meeting them on the street, always greet them joyfully.

On sale at the branch communications office are the latest issues of the republic newspapers, the journals "Ogonek," "Krokodil," "Rabotnitsa," "Moskovskiy Kolkhoznik" and others, as well as timely political pamphlets and literary novelties.

The experience of the Il'inskiy Branch Communications Office again proves that efficient, first-class public service depends, to a large degree, on the letter carriers, on their literacy level, their mental outlook, and their love for their work.

Most of the ten letter carriers at the branch communications office are young people. One-quarter of them have had secondary education, and the rest have gone throug seven-year school. Several are studying in a correspondence communications technical school and in an evening school for working youth.

The letter carriers have recently completed the study of the new postal rules and have passed their examinations successfully. In their spare time they help the postal agents and telegraph and telephone operators in thei work, and by doing this gain practical experience in the operations that these workers carry out. Letter carriers N.V. Kovylova, V.D. Umyvalkina and N.N. Zhuravleva, for example, are qualified to accept and distribute parcels and register

and insured letters. Z.V. Kovalenko has learned to operate the ST-T5 equipment and to make up accepted and communicated telegrams. V.V. Pakhomova can accept money orders. Letter carrier N.N. Zhuravleva is now carrying out the job of delivery department inspector at the branch communications office.

The growth of literacy and the general mental outlook of the letter carriers as well as the constant rise in their knowledge of production has made it possible to bring communications services closer to the population. Letter carriers now do more than only deliver newspapers, magazines and letters to the addressees. In the areas which are serviced by them, the letter carriers handle home remittance of money orders, deliver pension payments and accept subscribers' payments for permission to use television and radio receivers; all this work is in addition to their services in selling postal orders, post cards and envelopes. Previous to the date on which subscriber payments are due, the letter carriers deliver reminders to television and radio set owners. Having a list of those owners who have not paid on time, the letter carriers are encouraged to achieve full liquidation of these debts. Each letter carrier knows two or three delivery districts well. This makes it possible not to disturb the normal delivery of the press and mail to the population in case of sickness or during the regular vacation of one of the letter carriers.

Each letter carrier, when preparing to go out to the delivery district and also when making a delivery, make use of more efficient methods, which are generally recognized at postal communications enterprises (newspapers and magazines are sorted while the letter carrier is on his way to the district, inscriptions are not made on them and delivery is made according to a route book etc.).

We must note that by cutting down the time spent in preparing to go out into the district, the work of letter carriers in the branch communications office is made more convenient. The working places of letter carriers are furnished with standard production furniture. On the desk are boxes for sorting mail and a small compartment in which are kept ink, pencils and glue. A mail pouch, newspapers, magazines and a route book can be spread out on the desk.

The majority of letter carriers often receive prize for such things as excellent fulfillment of their duties, delivery of mail to the addressees on set dates, and overfulfillment of their monthly revenue tasks.

Letter carriers M.A. Zamotayeva, A.I. Molod'yeva, N.V. Kovylova, V.A. Dryn'kova and others are doing excellent work. They have been awarded certificates of the Mos-

cow Regional Communications Administration and the Regional Committee of the Trade Union of Communications Workers and Automotive Transport and Highway Workers.

Postal agent Comrade Kiseleva maintains her working place in exceptionally fine order. Her books and documents are kept very neatly and strictly according to the rules. Other workers follow her example.

The Il'inskiy Branch Communications Office is devoting serious attention to the study of interrelating jobs. As a result of this, communications workers can take each other's places when needed. This also makes possible the shifting of several workers from less complicated to more complicated work. For example, G.V. Malysheva previously had the job of delivering telegrams. Now she is a telephone operator and operates a telephone switchboard. In addition, she has learned to use the ST-35 equipment and has mastered the telegraph rules. Comrade Malysheva takes the place of the telegraph operator when the latter has a day off.

Telegram deliverers Z.I. Firsova and A.A. Rubtsov not only deliver telegrams to addressees at their place of residence exactly on time, but also accept telegrams at homes (while making deliveries), and when necessary, also at the branch communications office. O.P. Gritskova, a telephone operator provides efficient service to telephone subscribers and accepts telegrams.

As could be expected, the increase in the revenues of the branch communications office furthered high-quality public service. In 1957 the revenue plan was fulfilled by 104.6% – 100.3% in the field of postal communications, 124.1% in telegraph work, and 104.6% in long-distance telephone communications.

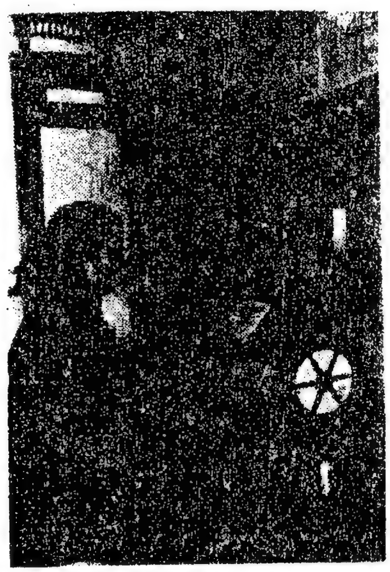
As a result of the improvement in the quality of work at the branch communications office, there was not one complaint from the public this year. The residents of the Il'inskiy settlement have shown fine response to the job being done by communications workers. Many letters of thank can be seen in the suggestion book of the office. Here is one of these responses. "I have been spending my summer vacations in Il'inskiy for several years, and my mail is sent there during that time. It is comparatively large – more than ten different types. All my mail – newspapers, magazines, books, letters, telegrams, money orders etc. are delivered to me punctually, without delay. The letter carrier are very fine, attentive, and courteous. But I especially wanted to say something about the exceptionally attentive and efficient attitude towards the clientele of N.D. Petrov the office Supervisor. I give her my thanks. Senior Scientific Worker at the Academy of Pedagogical Sciences, N.K. Konoblevskiy."

Letter carriers L.M. Kuznetsova, Z.T. Sviribovich and K.V. Kulikova set out on their delivery routes.

The collective staff of the branch communications office is friendly and works harmoniously. The spirit of the socialist competition is felt in it. The whole collective staff knows about the results of the fulfillment of duties according to the socialist competition every day. The fine showing of the enterprise is due, to a great extent, to the work of the Supervisor of the office, N.D. Petrova, who possesses a great deal of production experienc She passes this on to the youth. Mina Dmitriyevna loves her work and instills this love of the communications profession in the young workers. And her influence has a fine effect on the style of work of the communications workers. It is not accidental therefore that the assistant to the Supervisor of the office, the postal agents, the telephone and telegraph operators, and the letter carriers are efficient, courteous and attentive to the clientele. They fulfill the plan tasks successfully and observe the operational rules exactly in all aspects of communications. N.D. Petrova, as

well as the assistant to the Supervisor, Comrade Trofimova and the trade-union organizer Comrade Gritskova often have personal talks with each worker concerning his production work, studies and private life. In addition, Comrade Petrova checks the work of each communications worker right in the working place and renders, when it is required, needed aid.

Young communications worker T.K. Kospina learned how to operate the telephone switchboard quickly and handles her work well. She is now mastering the job of telegraph operator.



Telephone operator G.V. Malysheva learned how to operate the ST-35 equipment and, when necessary, can receive and send telegrams.

Nina Dmitriyevna will not skip by the slightest work omission. Every diversion from the operational rule becomes a subject for discussion by the collective staff of the branch communications office. The collective staff often encourages workers who show high production figures.

Comrade Petrova, as a deputy in the local Soviet, gives regular reports to the electors about the work of the branch communications office. She enjoys the deserved authority and respect of both the population and of local organizations.

The collective staff of the Il'inskiy workers of the branch communications office has become an example of first-rate work in providing public services through communications facilities. Communications workers of other branc communications offices of the Ramenskoye District in Kratov Udel'hiy, Ivanovka and Shevlyagin have followed this exampl The very fact that the Il'inskiy Office has achieved a high quality status has made the supervisors of the Ramenskoye District Office change the appearance of the office itself and improve the quality of work.

The Il'inskiy Branch Communications Office is known far beyond the limits of its district. In order to gain first-hand experience with the work of communications worke of other districts of the Moscow Region, auditors of course given by supervisors of communications offices and branches and their assistants, and organized by the Moscow Regional Communications Administration, as well as workers' supervisors from the communications administrations of a number of other regions.

The branch communications office was visited by del gations of communications workers from socialist countrie (China, Czechoslovakia, Bulgaria, Rumania, Hungary, Mongoli During the VI-th World Festival of Youth and Students delegations of communications workers from China, Korea and Egypt came there.

The collective staff of the branch received a certificate for their active participation in the festival from the Soviet Committee that was in charge of conducting the VI-th World Festival of Youth and Students.

Not standing on their past laurels, the harmonio collective staff of this leading branch communications office makes new achievements from day to day in the field of public service.

S.G. VOLKOV
L.Ya. YAKOVLEV

THE CONFERENCE OF LONG-DISTANCE TELEPHONE COMMUNICATIONS SUBSCRIBERS

As a rule, workers in long-distance communications only "meet" their clients on the telephone. The communications workers at the Frunze MTS (Long-Distance Telephone Exchange) decided to break this tradition: they organized and held a conference of those who make use of long-distance communications services. The communications club, where the conference took place, was crowded over. Comrade Kalyuskiy, a member of the Collegium of the Ministry of Communications of Kirgiz SSR, appeared before the participants of the conference; he reported on the status and perspectives for the development of long-distance telephone communications in the republic. Comrade Valeva, an engineer at the Frunze MTS, told about how the station operates.

Taking part in the discussion of the questions that were put forth were 15 persons.

Comrades Kurmanaliyev and Afanasenko, who often make use of long-distance telephone communications, having noted the general improvement in public service, turned attention to cases of rudeness by individual telephone operators and to instances of inaudibility; subscribers living in rural areas often come across these problems when making calls. Comrade Muravlev brought attention to the fact that one must sometimes wait a long time when making a call at the call office at a branch communications office.

Comrade Tsurikov noted that the opportunity to use MTS services is limited by the fact that the network of apartment telephones is insufficiently developed, whereas individual organizations are provided with a great number of telephones, although often without special need. He suggested that, through the city executive committee, the question be decided about turning over a certain number of official telephones to the public.

Comrades Korabekov, Anan'yev and others spoke about the fact that it is hard to make connections through Moscow with people living in foreign cities.

Comrades Volkova and Petrichenko noted that the through connection between Alma-Ata and Tashkent is poorly organized. Extremely little time is given for conversations with subscribers in Novosibirsk, Sverdlovsk, Kuybyshev, Orenburg and Karaganda.

The participants of the conference suggested that a reduced price be put into effect for long-distance tele-

phone conversations made not only at night but during the evening as well, when many lines are not overloaded; they also proposed that there be no charge for faulty connections.

A number of suggestions were introduced which advocated an expansion in the limit of services granted by the MTS. Thus, in the opinion of students Comrades Beysa and Karabekova, there should be an opportunity to make reverse-charge calls with the consent of the person involved.

The participants of the conference expressed the hope that the public be granted, for a special payment, the opportunity to get certain information through the MTS: information concerning train schedules, the results of sporting events, and the addresses of individuals and institutions in other cities.

The conference was very useful. The Ministry of Communications of the republic in conjunction with the collective staff of the Frunze MTS is now carrying through a number of measures to improve long-distance telephone communications, taking into consideration the critical remarks and suggestions expressed by the participants of the conference. There is no doubt that the business contact which has been established between the MTS workers and their clients will serve to further a rise in the quality of public service.

The Union Ministry of Communications of the SSR, whose representatives, unfortunately, were not present at the conference, should help us to fulfill the desire of the participants of the conference (this means increasing the time allotted for conversations with certain cities, about which there is a great delay, and also expanding the opportunities for making through calls).

Those present at the conference inspected a remodeled new long-distance telephone exchange, which was fitted with modern equipment. A new room, furnished with excellent and comfortable telephone booths, left a very good impression among them.

It seems to us that it would be very advisable to hold such conferences in other cities of our land.

Ye.L. KALYUSKIY, Supervisor of the Telecommunications Section of the Kirgiz SSR Ministry of Communications

Communications Workers' Initiative

A COMBINING OF JOBS

At the Kirov Exchange of the Frunze Telephone Cente of Leningrad the jobs of truck driver and inspector for eliminating faulty subscriber stations were combined.

K.A. Sadikov, a driver from the transport office of the Leningrad GTS (Municipal Telephone Exchange), whose truck has been allocated to the Kirov Telephone Exchange, has mastered, with the aid of a leading inspector and technician, the duties of a district inspector. Making use of a truck, Comrade Sadikov carries out work in eliminating trouble in the district, whose over-all area is 72 thousand square meters. The district has more than 5,500 telephone booths which are widely scattered.

Comrade Sadikov always has in his truck all necessary instruments: a folding ladder, wire used for temporary maintenance work, single-pair TRVK (not identified in standard text),single-pair cable, spare telephone equipment and spare parts for this equipment. Working in the district assigned to him, he eliminates all trouble on the checking date.

A normal staff of three is required to service Comrade Sadikov's district. As a result of the fact that this work is being done with the use of a truck, two inspectors have been released to the exchange and a rise in labor productivity has been achieved.

G.I. SPIVAK, Chief Engineer at the Frunze Telephone Center of Leningrad,
B.A. SHURDUT, Senior Engineer-Economist

AN EVENING FOR LETTER CARRIERS AND TELEGRAM DELIVERERS IN GOR'KIY

An evening for the letter carriers and telegram deliverers of the communications enterprises of the city was held in the V.I. Lenin Culture Palace. About 450 persons were gathered there. After a short introductory address by K.A. Levichev, the Supervisor of the post office, his deputy, Sh.B. Litvin, told of the work of the best letter carriers and of the tasks in improving public services for this city. Letter carriers also made reports, sharing their work experience.

Afterwards a concert was given by the amateur group of musicians at the Palace of Culture.

A.V. KhOLSTOV

THE RESULTS IN THE COMPETITION FOR THE BEST SUGGESTION

During 1956-1957, the USSR Ministry of Communications carried out a branch-wide competition for the best suggestion (as part of the efficiency-suggestion program) in the area of the mechanization of labor-consuming processes involved in the handling of telegrams. Very few suggestions were submitted in response to the competition. This is a consequence of the inadequate attention devoted at the telegraph office to the problems of mechanizing labor-consuming processes. In addition, the purposes of this competition were not adequately publicized among the communications workers.

Of the submitted suggestions, examined by the commission in charge of the competition, six suggestions were recommended for introduction. The authors of the best suggestions were awarded bonuses in accordance with an order issued by the Ministry of Communications.

The second prize, 1,500 rubles, was awarded to G.B. Ryabom and M.V. Vasil'kov, workers at the USSR Central Telegraph Office, for their development of a device which prevents the blanks carrying the perforated tape from falling off the wide conveyor belts. The device is technically simple and can be produced locally.

The third prize, 1,000 rubles, was awarded to A.P. Susanin, K.N. Ivanov, and Z.L. Bernatskaya, workers at the USSR Central Telegraph Office, for their design of an automatic-link panel, fitted out with STA equipment. As a result of this design, the telegram retransmission panel can be supervised by a single telegraph operator; two telegraph operators can service the links.

Incentive bonuses were awarded to the following:

to the team (brigade) of participants in the efficiency-suggestion program at the Chelyabinsk Telegraph Office, said team consisting of S.M. Derkunova, A.N. Smirnova and S.I. Teterina, for their development of a method for the processing of multiple address telegrams. The introduction of this method, supplemented by a series of operations in use at the USSR Central Telegraph Office, will lead to a reduction in the number of intrastation stages involved in the processing and typing of telegrams;

to the inspector of the Chelyabinsk Telegraph Office, N.Ye. Rogachev, for his suggestion of a design for an automatic console-type receiver. The automatic console-

type receiver uses the spring of a Morse unit as its drive. The automatic console-type receiver is simple, and can be produced locally;

To V.A. Voronov and V.I. Promakhov, senior technicians at the USSR Central Telegraph Office, and to M.I. Zalmanovich, an inspector at the Sverdlovsk Telegraph Office, for their development of a device which signals the end of a transmissions and which tears off the perforated tape in STA units. The introduction of this device will make it easier for the telegraph operator to operate this unit.

The communications ministers of the various republics in the Soviet Union, and too the supervisors and chief engineers of isolated enterprises were reminded of their duty to undertake measures to introduce the recommended suggestions on a large scale. Their attention was also turned to the necessity of continuing their efforts in the mechanization of labor-consuming processes involved in the handling of telegrams, this in addition to their responsibility to automate the retransmission of telegrams, will lead to a rise in labor productivity at the telegraph offices.

The Main Postal Administration of the USSR Ministry of Communications organized a branch-wide competition in 1957 for the best suggestion in the area of design developments of dusting tables, conveyor belts for pickup points, and other mechanization facilities for difficult and labor-consuming operations in the area of postal communications.

A number of unique and valuable suggestions were submitted during the course of the competitions. Of the total number of suggestions submitted, 13 suggestions were accepted for introduction or utilization in the development of new designs.

The authors of the best suggestions, selected by the commission in charge of the competition, were awarded bonuses in accordance with an order issued by the Ministry of Communications.

The first prizes, 3,000 rubles were awarded to the following:

A.N. Ugol'nikov, a senior engineer, and Sh.Sh. Nezametdinov, an acting engineer, both workers at the Moscow Post Office, for their development and production of a dusting-table model to be used at a single work position. This dusting table is distinguished from existing tables through the considerable reduction in noise, and the fact that it can use much simpler filters;

to V.S. Kligman, the director of the laboratory, and Yu.S. Krasavin, an engineer, both workers at the Moscow

Post Office, for their design of a conveyor belt with an extension. The use of such conveyor belts in the loading-unloading operations at postal enterprises will facilitate the work of the individuals engaged in the transfer of mail, and will speed up the loading and unloading processes in the case of trucks;

to the integrated team (brigade) of efficiency experts at the Moscow Post Office, consisting of engineers M.P. Golynin, A.P. Dobrotsvetov, B. M. Yurovskiy, and technician N.K. Andreyev, for their development of an automatic vending machine for the sale of ten types of postal cards and envelopes. This automatic vending machine accepts 10, 15, and 20 kopeck coins. This automatic unit operates on photoelectric cells and relay-calculator counter devices.

The second prizes, 2,000 rubles, were awarded to the following:

B.G. Bodrov, the chief engineer of the mail deliver department of the Kazan Railroad Station in Moscow, for his development of a simple and inexpensive mobile conveyor belt with an overhead crane arm;

to G.P. Zasetskii, the chief engineer of the Giprosvyaz' (State Institute for the Design and Planning of Communications Facilities), and to the integrated team of workers from the Moscow Post Office, consisting of senior engineers V.N. Nitche and N.A. Mel'man, senior technician V.N. Makukhin, and mechanic I.N. Baranov, for their development of an inexpensive and noiseless conveyor belt with a 305-mm-wide cotton-fabric belt, and an electromagnetic drive to turn the chute doors.

The third, 1,000 rubles, was awarded to the following:

T.M. Ber and I.Z. Aronov, engineers at the Moscow Post Office, for their development of a design for an extendable conveyor belt;

to the integrated brigade in the Mail Delivery Department of the Kursk Railroad Station in Moscow, said brigade consisting of the senior engineer N.I. Strel'nikov, mechanics V.N. Zav'yalov and S.I. Titov, for their suggestion, improving the design of the bundle-tying MV-3 unit

to Sh.Sh. Nezametdinov, an acting engineer at the Moscow Post Office and to the senior technician I.V. Barishenkov, for the development of a date stamp to be attached to cancellation machines. The implementation of this suggestion will make it possible to use only a single stamp for the calcellation machines set up at major postal enterprises, instead of the six such stamps normally in use. This design will come into use in 1958, as new cancellation equipment is developed.

Incentive payments were made to the following: V.N. Molodcheno, an engineer at the Kirovograd City Communications Office, for his suggestion of a two-way conveyor belt, which can be stored in a special area cut into the wall. The conveyor belt is designed for loading-unloading operations; to P.P. Karasev, the senior technician of the mail delivery department at the Yaroslav Railroad Station in Moscow, for different versions of filters for the dusting tables; to T.M. Ber, an engineer at the Moscow Post Office, for the development of a design for a two-way conveyor belt with a variable slope; to I.Ya. Abramovich, an engineer at the Kiev Post Office, for a design of an extendable conveyor belt to be used in the Kiev House of Communications.

The Ministry of Communications is preparing a plan for the implementation of those suggestions approved by the commission in charge of the competition. During the first half of the year, a collection of descriptive materials for these suggestions submitted during the suggestion competition will be prepared and published; the suggestions included in this collection will be those that have been accepted and approved for implementation.

In order to continue improving existing postal mechanization facilities, as well as to develop new facilities, as of 1 March 1958 a competition for the best suggestion in the field of postal techniques will be announced. Fifty thousand rubles will be allocated as prize money for the best suggestions and production of models based on the suggestions submitted during the course of the competition.

DEVICE FOR TESTING QUALITY OF SPLICES IN CABLES WITH POLYVINYL CHLORIDE SHEATHING

In splicing the ends of bundles of cables with polyvinyl sheathing, the quality of the splice is generally determined "with the naked eye." As a result, we frequently find that some time after the cable has been laid down, the insulation of the underground line gradually deteriorates. This leads to extensive expenditures of labor and time in seeking out the faults, digging operations at the point of fault, and reinsulating the bad splices.

I have suggested a device which will make it possible to test the quality of splices, and three to five minutes are spent on testing a single splice.

The device involves a metallic hermetically sealed rectangular box. The design and basic dimensions of the frame and cover are shown in Figs. 1a, and b. The depth of the grooves in the rubber padding through which the cable is passed is 1.5 mm. The PRVPM cable consists of two conductors; therefore the grooves are separated by rims which, when the cover is pressed to the frame, provide the required hermetic sealing.

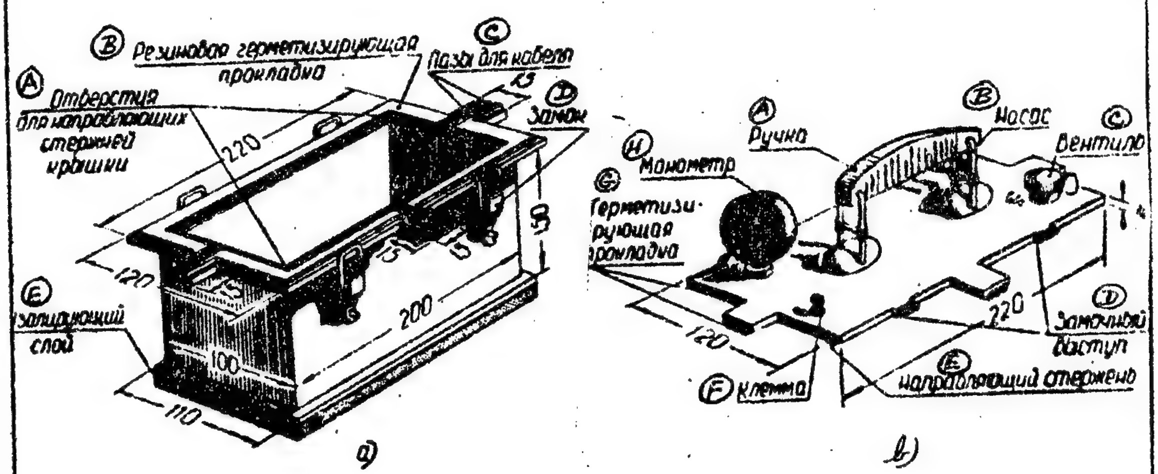


Fig 1.

a). A) Opening for cover guide rods; B) rubber padding for hermetic sealing; C) grooves for cable; D) lock E) insulation layer.

b). A) Handle; B) pump; C) valve; D) lock catch; E) guid rods; F) terminal; G) padding for hermetic sealing; H) manometer.

A manometer which can handle up to 2-3 atm has been attached to the cover; in addition, there is a pump which is used to force air (the pump from a primus stove or from a blow torch can be used), a valve which permits the air to escape after the splice has been tested, a terminal for the connection of the measuring instrument (an ohmmeter or a megohmmeter), and a handle to carry the device.

On Fig. 2 is shown a schematic diagram of the device used to test the insulation of the splice. The cable splice is immersed into the frame of the device that has been filled with water, and the cable ends are passed through special openings provided for this purpose. The cover is placed firmly upon the frame and fastened by means of four locks. One lead from the ohmmeter or megohmmeter is connected to the terminal, and the other lead is used to ground the device. By means of the pump, the pressure in the device is raised up to approximately 2 atm. Since the frame is made of metal, it must be insulated from the ground — the device must be placed upon insulation padding.

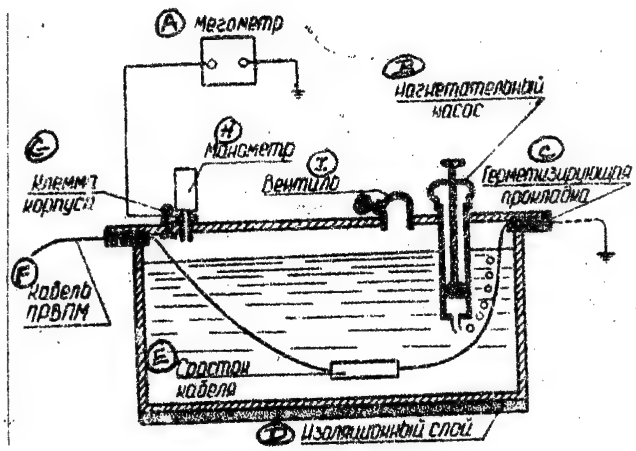


Fig. 2.

A) Megohmmeter; B) force pump; C) padding for hermetic sealing; D) insulation layer; E) cable splice; F) PRVPM cable; G) frame terminal; H) manometer; I) valve.

The initial end of the first cable bundle is grounded.

If the splice is not of a good quality — if there are capillary openings — then the air, under pressure, will

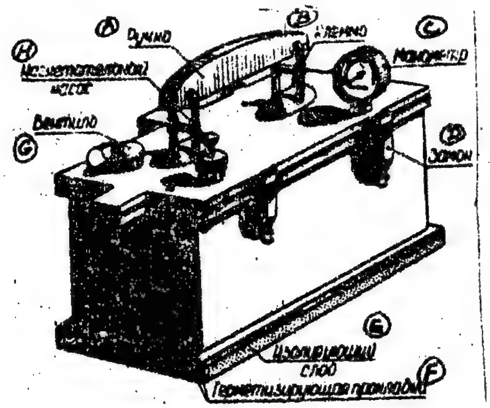


Fig. 3.

A) Handle; B) terminal; C) manometer; D) lock; E) insulation layer; F) padding for hermetic sealing; G) valve; H) force pump.

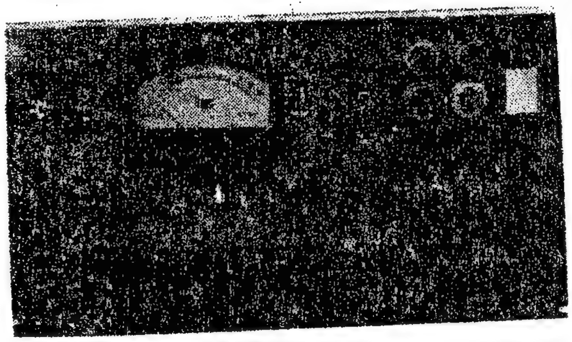
force water through to the cable conductors and the insulation of the splice becomes less effective, and this will be recorded by the measuring instrument (the following electric circuit is completed: the grounded end of the bundle — the cable conductor — the poor-quality splice — water — frame of pump in water — terminal on cover — device — ground).

On Fig. 3 is shown the over-all view of the device. The three outlets are intended for purposes of testing line splices and splices of lines with branches ("Y-joint"). In checking the line splices in the third inlet, a piece of the cable is inserted in order to provide for hermetic sealing.

The frame and cover can be made of insulation material; in this case, the terminal on the cover must be connected electrically to the frame of the pump.

A.YE. TSUPRIKOV, Engineer, Laboratory of the Krasnodar DRT (Wire-Broadcast Network Administration)

A SYSTEM FOR REMOTE MEASUREMENTS ON EQUIPMENT INSTALLED AT UNATTENDED REPEATER STATIONS



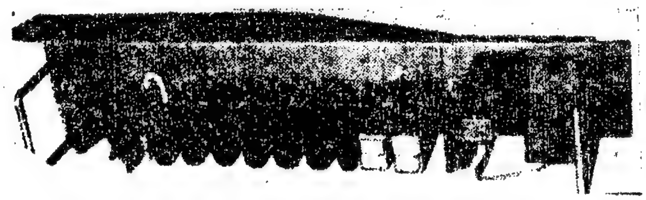
M.L. Shuman, an engineer at the Installation Administration of "Mezhgorsvyaz'stroy" (State All-Union Trust for Building Structures of Intercity Wire Communications), has developed a system for remote measurement and testing of the most important parameters of K-24 equipment installed at unattended repeater stations along trunk cables.

This system makes it possible for a technician at an attended repeater station to determine remotely the level of a 12-108 kc measuring current at the outputs of the amplifiers of all unattended repeater stations associated with his station. In addition, two resonant two-terminal networks may be connected remotely to the output of any repeater; using one of these two-terminal networks, it is possible to locate an amplifier having decreased nonlinearity attenuation, and using the other two-terminal network, it is possible to locate an amplifier introducing increased internal-noise voltages into the channel.

A pair of pilot conductors is used to transmit the results of the measurements from the unattended repeater stations to the attended repeater station. The number of pilot conductors required to transmit control signals depends upon the number of unattended repeater points associated with the given attended station, and upon the number of K-24 systems in operation.

In order to carry out remote measurements from the attended repeater station, a level amplifier and simple

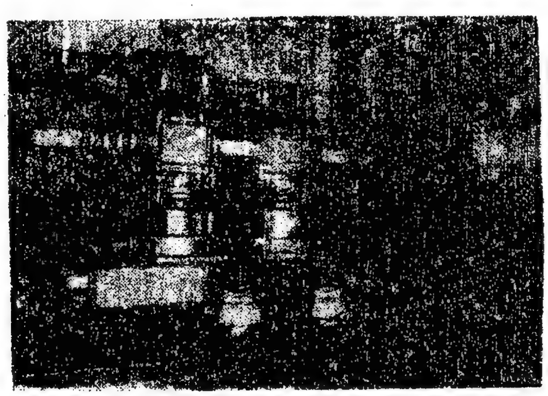
*Personnel making suggestions to improve methods and equipment.



auxiliary equipment are used. This equipment unit is shown in the first photograph. At the unattended repeater stations, two panels of auxiliary equipment are installed (one of these panels is shown in the above photograph).

Line tests of experimental models of the equipment developed by Comrade Shuman, carried out over a six-months period on one trunk cable, confirmed the desirability of utilizing this equipment. At the Installation Administration of "Mezhgorsvyaz'stroy" similar types of units have been manufactured for use on a cable trunk about 600 km long.

UTILIZING A STANDARD UNIT WITH GU-80 TUBES IN A TELEVISION TRANSMITTER

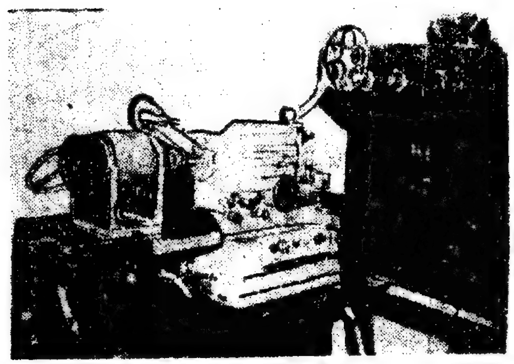


At the suggestion of Comrade Yevdokimov, an engineer at the Moscow Television Center, the older G-425 tubes in the television transmitter have been replaced by a standard unit utilizing GU-80 tubes, taken from a UKV (ultrashortwave) transmitter. As a result of carrying out this

suggestion, there has been a sharp decrease in the number of cases in which the station has been forced off the air for technical reasons. In addition, replacement of burnt-out tubes has been simplified.

The photograph shows the unit using GU-80 tubes, installed in the television transmitter.

A NARROW-FILM TELEVISION PROJECTOR



As a rule, newsreel film is taken on narrow (16-millimeter) film. At television stations, however, there are no television projectors capable of furnishing a program directly from such film. This has led to the necessity of transferring the picture from narrow film to wide film, thanks to which exposed film cannot be rapidly transmitted over television.

Comrade Timofeyev, an engineer at the Moscow Television Center, has utilized a "Ukraina" narrow-film motion-picture projector as a 16-millimeter television projector. In order to do this, the synchronous motor of the projector was replaced with an asynchronous motor, and the shutter and pinions of the film-transport mechanism were modified.

COMMUNICATION TECHNIQUE ABROAD

SUBSCRIBER'S TELEGRAPH IN THE GERMAN DEMOCRATIC REPUBLIC

Subscriber's Telegraph Network Construction in the GDR.

After the end of the war, it was necessary to build anew the telegraph communications network in the German Democratic Republic due to the huge destruction caused by military action. In the first turn there was constructed a subscribers' telegraph network with a manual system, which was enlarged in keeping with the growth of national economy of the republic. However, the possibilities of broadening the subscribers' telegraph network were soon exhausted and the need for opening new communications remained unsatisfied. Existing communications were overloaded, and this slowed down the transmission of messages, especially when many transfer points were involved in establishing a connection. This resulted in poor utilization of channels and an increase in the cost of processing telegrams. Three to five minutes, on the average, were spent in establishing a connection and the average transmission time was 4.5 minutes. The faults enumerated insistently demanded the automation of subscribers' telegraph communications. The construction of an automatic subscribers' telegraph network was basically completed in the first quarter of 1956. In the next few years is contemplated the broadening of this network and the making of a number of improvements, directed toward the rationalization of production processes which should make subscribers' telegraph communications more economical.

SYSTEM SELECTION

The adoption of the automatic subscribers' telegraph in Germany first began in 1935. On the basis of valuable experience accumulated in the following years, automatic system TW-39 was created.

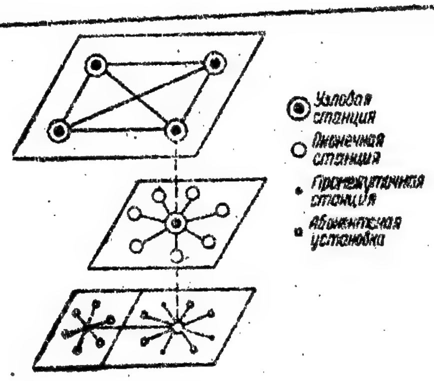


Figure 1
1-Junction center station; 2-Terminal station;
3-Intermediate station; 4-Subscriber installation

Before proceeding with the automation of subscribers' telegraph communications in the GDR, it was necessary to decide whether to modernize system TW-39 or whether to develop a new system on the basis of motor selectors. In solving this problem, the necessity for the most rapid satisfaction of the requirements of the national economy was taken into account first of all. As a result, a new automatic subscribers' telegraph system, TW-55 was created which basically utilized the principles of system TW-39. Essential changes were made only in the zone and time register; the territorial division of the GDR into only two tariff zones (local and long-distance permitted considerable simplification in the register.

The structure of the automatic network of subscribers' telegraph in the GDR is shown schematically in Figure 1. The network is constructed to correspond with the administrative divisions of the republic (oblast, region). Intermediate terminal and junction center stations are included in the network.

An intermediate station usually serves three administrative regions. It is not wired for all selector stages; therefore, it is not an independent telegraph point. The purpose of this station is to connect dissociated subscriber lines and, through a stage of preliminary selection, bring them out to the nearest terminal station.

The use of intermediate stations permitted considerable shortening of connecting lines and aided in more effective utilization of basic circuits. Each intermediate station is connected only to the subscriber installations and to one terminal station; thus, in this section the network is built on the radial system.

Terminal stations are independent telegraph points and are located in regional centers of the republic. There are 15 such stations operating in the GDR. They are connected to intermediate and junction center stations and to the nearest subscriber installations.

In the future it is planned to connect terminal stations directly with each other in districts where great mutual gravitation between them is observed. As a result of this, there will be obtained a mixed network in which, along with stations connected in a radial system, there will also be stations connected on the principle of "each to each".

At the present time there are two junction center stations in the GDR. The entire traffic between terminal stations passes through these stations.

STRUCTURAL FORM OF STATION AND SUBSCRIBER INSTALLATION

Figure 2 shows subscribers' telegraph station, TW-55, with a 40 number capacity. In its equipment, as well as in the telephone automatic controls, ten-step selectors are used. The station assembly contains preselectors PI, group selectors IGI and IIGI, line selectors LI, transfer device PU, zone and time registers SZV and a bay with time pulse machines.

Forty preselectors and an equal number of registers are installed in bay PI. Each two subscriber se s form a relay panel and ten PIs form one PI mounting pl te. Thus, a PI bay contains twenty relay mounting plates and four rotary selectors plates. The plates are distributed symmetrically in the upper and lower parts of the bay. In the middle part of the bay is located the mounting plate of the monitoring-metering instruments.

In the technique of subscriber telegraphy the PI

has the functions of not only preliminary selection, but supplying power to the subscriber installation, i.e., it partly fulfills the functions associated in telephone automation with IGI. A subscriber assembly has seven telephone and two telegraph relays.

Twenty devices are distributed on each GI bay. The first group selector, differing from devices of other stages of group selection, is connected to the zone and time register SZV.

Figure 2

Group selectors are subdivided into two kinds: a GI with an inverse pulse and a GI without an inverse pulse. Selectors of the first kind are used in the first selection stage and as devices connected in the PU circuit. The inverse pulse, 25 milliseconds long, is sent from the IGI circuit to the calling subscriber as a signal indicating that the station is ready to receive the dialing pulses. The inverse pulse is sent by the GI circuit connected in the PU circuit to terminate the occupancy of the transfer device. The changeover of group selectors from one kind to another is made by changing the arrangement of the jumpers on the bay.

Beside the IGI are located the zone and time registers. The register circuit permits, if necessary, changing the number of service zones.

The LI bay is equipped with twenty selectors. The difference between the LI and the GI consists in that the vertical and rotary motions of the LI brushes are controlled by pulses sent from the subscriber installation dial. Depending on the method of exploitation, LIs are divided into four kinds: line selectors with inverse pulse, line selectors without inverse pulse, line-group selectors (LGI) and series line selectors (SLI). LIs without an inverse pulse have received the greatest usage. At small capacity stations, where group selection does not take place, LIs with inverse pulse are used; aside from their basic functions, these devices fulfill one of the IGI functions, i.e., they send to the subscriber calling a signal "station answer". Selectors with an inverse pulse are also used for service line selectors. When a connection is made to a service line which belongs to the free call category, the inverse pulse disconnects the zone and time register. If the brushes of the line-group selector stop on the first to ninth decade contact banks, the line-group selector operates as an ordinary line selector, but if the br he: stop on the zero decade, it operates as a group selector A device of this kind is used for a small capacity station (where there is no group selection stage), since the connection "city connection" - "long-distance connection" is usually established through the zero decade of IGI. If the subscriber installation has several tele-

graph sets, the connection is made through a series line selector. Its brushes rotate to select a free exit to the subscriber installation apparatus.

Forty sets of transfer devices are distributed on the PU bay. Each two sets form a relay panel. The relay panels are placed symmetrically in the upper and lower parts of the bay. The monitoring-metering mounting plate and the message-call device for conducting telephone conversations are wired in the middle part of the bay. Interstation connecting lines are connected to the station equipment through the PU. The line side of PU is connected through a four-wire circuit and the station side is connected through a three-wire circuit (the exit to selector stages is also three-wire). The function of the PU is matching the four-wire circuit for channel connection to the three-wire circuit of the station devices, and the transmission of code signals (call and others).

The time pulse machine bay contains two machines which operate in turn. This equipment sends time pulses to the register device, with the number of pulses depending on the zone called.

At the subscribers, besides the telegraph apparatus, there is installed a calling device with call and ringoff buttons, dials, indicating lamps, and a device for connecting the motor of the telegraph apparatus to the alternating current network. At the present time there is under way in the GDR the development of a new design for the calling device with an attachment permitting the subscriber to connect the apparatus "on itself" without calling the station. Such a connection is required for training purposes (for learning the telegraph apparatus keyboard operation by employees of the enterprise), and for preliminary perforation of the transmitted text. If a call is received while the apparatus is connected "on itself", the apparatus is automatically connected to the line.

BASIC PRINCIPLES OF CONNECTION AND NUMBERING ARRANGEMENT

Figure 3 shows a block diagram of the connection between subscribers of a junction center US, terminal OS and intermediate PS stations.

All subscriber installations located not more than 30 km from the station are connected to the local subscriber panel. In this case, the subscriber installations operate on a two-wire circuit with uni-directional currents. The conversion of single-polarity signals into two-polarity signals (±) is made on the local subscriber panel. Thereby the current pulse corresponds to the plus part of a pulse train and the absence of current corresponds to the minus part.

To connect subscriber installations which are so far removed from the station that the current in the two-wire circuit does not reach 40 ma, long-distance subscriber panels are used with the exit of the subscriber panel connected in a four-wire circuit (double-polarity operation). In the majority of cases, frequency telegraph channels are used as subscriber lines for long-distance subscribers. A terminal set is installed at the exit to the subscriber which has a four-wire input on the station side and a two-wire output on the subscriber installation side. This set also provides the power supply to long-distance installations. If necessary the long-distance terminal set can be converted to a local subscriber terminal set by means of rearranging jumpers on a terminal strip.

If required, the lines of the local or the long-distance subscribers can be connected through a special PI. The latter differs from ordinary PIs in that a subscriber installation connected to it can be called only by an installation also connected to a special PI. The connection to the general subscriber network can also be made through such a preselector.

Independently of the method of connection, any

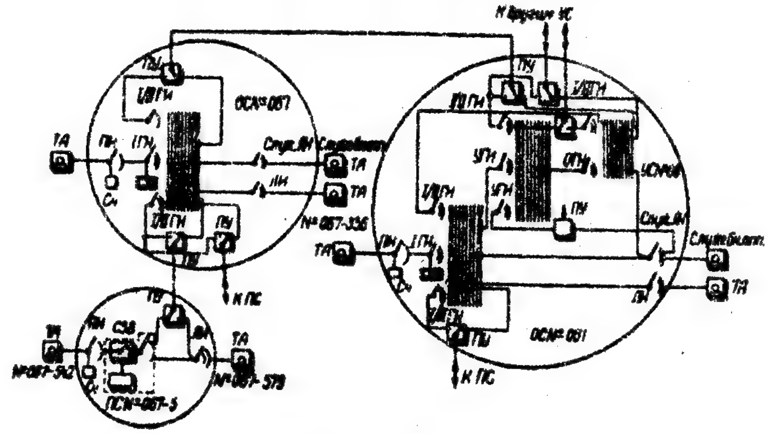


Figure 3
1-PU; 2-I/IIGI; 3-OS; 4-TA; 5-PI; 6-IGI; 7-Service LI; 8-S_{ch}; 9-LI; 10-SZV; 11-PS; 12-To PS; 13-Service apparatus; 14-To other US; 15-UGI; 16-OGI; 17-IGI; 18-US

PI can be arranged for through selection. For this purpose a telephone relay is introduced into the preselector circuit, and minor changes are made in the jumper arrangement on the terminal strip. Relay G, which has a capacitor connected in parallel with its coil, releases its armature very slowly so that the PI remains blocked for a considerable time. The retardation time is selected in a manner so that after the ringoff signal is sent, all the devices taking part in the connection will be freed before the next engaged condition of the PI occurs.

Through selection is necessary in those cases where the subscriber has, in addition to the basic installation, an additional installation which must receive direct calls. For connection with the additional installation the subscriber calling must dial one or several additional digits after dialing the basic number.

ESTABLISHMENT OF CONNECTIONS

Since, at the present time, the GDR has only two tariff zones (long-distance and local), the first digit of a long-distance number is always "0" (long-distance digit). The number of any subscriber consists of the long-distance digit, the digit corresponding to the last

digit of the junction center station number, the digit corresponding to the last digit of the terminal station and the number of the subscriber proper, consisting of three digits.

As shown in Figure 3, junction center station US (No. 06) has three stages of group selection - first group selector IGI, group selector of junction center UGI and group selector of terminal station OGI.

Bank I/IIGI, inserted after the PU which provides an exit to intermediate station PS, is connected in parallel with bank IGI. Bank I/IIGI, inserted after the PU which provides an exit to terminal station OS, is connected in parallel with bank UGI. Finally, bank I/IIGI, inserted after the PU which provides an exit to other junction center stations, is connected in parallel with bank OGI.

Terminal station OS (No. 067) has one stage of group selection (IGI) and the intermediate station PS (No. 067-5), as mentioned previously, does not represent an independent station and does not have group selection.

We will clarify in the following two examples the principles of establishing connections.

Let subscriber No. 542 of an intermediate station No. 067-5 call subscriber No. 336 of terminal station No. 067. This will be a local connection; therefore, the number of subscriber called does not include digit "0" and the number of the terminal station. When the subscriber presses the call button, the brushes of pre-selector PI start moving and will stop at the exit to a free PU of a terminal station. Further, there will occur the occupancy of I/IIGI through this PU. When the first digit of the number is dialed the brushes of I/IIGI rise to the third decade of the contact bank and then search for an exit to a free LI. During the dialing of the last two digits, the LI brushes rise to the third decade and stop on the sixth contact to which the line of the subscriber being called is connected.

If a subscriber of some other terminal station calls subscriber No. 578 of intermediate station No. 067-

5, he must dial a six-digit number, 067-578. When digit "0" is dialed, IGI of the terminal station, to which the line of the subscriber who is calling is connected, will raise its brushes to the zero decade all the exits of which lead to group selectors of its own junction center station. In this example the connection must pass through junction center station No. 06. Therefore, when the second digit of the number is dialed (digit 6), brushes of UGI rise to the sixth decade all of whose exits lead to OGI junction center station No. 06. During the dialing of the next digit (digit 7), the brushes of OGI of station No. 06 rise to the seventh decade and engage I/IIGI of terminal station 067 through PU. When digit "5" is dialed, the brushes of I/IIGI of station No. 067 rise to the fifth decade and search for a free exit to intermediate station No. 067-5 through the PU of the terminal station. Finally, when the last two digits of the number are dialed, brushes of the LI of station No. 067-5 will stop on the contact to which the line of the subscriber being called is connected.

The charge for messages proceeds during the subscriber call by transmission of register pulses from the zone and time register SZV to rate registers installed in bay PI. Each register pulse corresponds to a certain money value, so that the toll for each minute of the call is determined by the number of pulses. The call metering starts at the moment a connection is made to the apparatus of the subscriber being called. If the first two digits of the number are digits "1" to "8", this corresponds to the local zone as can be seen from the block diagram. All the long-distance connections pass through the zero decade bank of IGI and service (free) calls pass through the ninth decade.

V. Khentshel', Engineer of the Ministry of Posts and Communications of the German Democratic Republic.

V.I. RADUKHIN AND N.D. STAS'

"THE TRANSPORTATION OF MAIL"

(Svyaz'izdat [State Press of Literature on Communications and Radio Problems], Moscow, 1957, 195 pages. Price 5 rubles 25 kopeks)

This book, as the authors point out in the preface, has been designed to fit into courses in "Organization and Means of Mail Transportation" within the framework of communications technical school curricula. This textbook is intended to assist technical school students to assimilate the fundamental principles of the organization of mail transportation and to master the practical skill that will be necessary to them in their work in postal enterprises.

It should be noted that the contents and the distribution of the material in the book answers the purposes of the authors to an adequate degree. A good textbook, needed not only by students but also by specialists engaged in work in mail transportation departments (OPP's), has come off the press.

The book gives an account, sufficiently detailed and clear, of the fundamental principles of the organization of mail transportation, of the purpose of the OPP, of the arrangement of work in all the basic sections of the OPP, and of the relationships of communications agencies with the agencies of the USSR Ministry of Railroads. When necessary, specific examples of certain computations are introduced, the order in which postal regulations are employed, and instructions on processing and sorting letter mail and parcel post.

One feels that the authors are well acquainted with the practice of mail transportation divisions and have a perfect knowledge of the organization of the basic work processes in the handling of mail.

One has quite a different impression after reading the last three chapters of the textbook, which are devoted to the transportation of mail in airplanes, along waterways, by motor vehicle, and in carts. The book devotes undeservedly little space to these problems. The material in the last three chapters is presented as though in isolation from the general tasks set out for communications workers by the Directives of the 20th Congress of the CPSU. The fact has been forgotten that extensive application of air transport is one of the basic trends in the technical prog-

ress of the Soviet Postal System. No data on the increase of airmail traffic are given. Nothing is said of the outlook for the further development of mail transportation by motor vehicle and airplane.

An idea should also have been given of the basic technical and operational indexes of the work of motor vehicle transportation, with appropriate examples.

This text says nothing, unfortunately, about the study and introduction of advanced methods of labor or of the organization of socialist competition in the enterprises engaged in the transportation and processing of mail.

The text also contains inaccuracies. For example, on page 17, we read: "If the indexes of the exchange and quantity of the traveling teams do not coincide, the class is designated according to the lowest index." This is incorrect. If the indexes do not coincide, the class is designated as the class one below the highest index.

The example introduced on page 51 was a bad choice. If the authors had indicated that they were writing about the bundling of mail in Moscow, there might have been some sense to it. But there is no such reservation, and postal workers who live in, let us say, Novosibirsk, and who read that letters going to Orenburg and Chimkent must be wrapped in a "PV 69" postal package, can only be astonished and refuse to agree with the authors.

The functions of the section for sorting and processing insured letter mail are inaccurately formulated (page 74). According to the authors, this section processes (and registers according to destination) only incoming mail arriving from the railway postal cars and the outgoing mail of the given city. However, this work is only 20% of the work taken care of by this section; the remaining 80% involves the processing of transit mail, which the authors have forgotten.

Paragraph 5.2 is entitled, "The Calculation of the Work Force and Work Stations," but the calculation of the work force has been shifted from this paragraph to the preceding paragraph, while neither this paragraph nor any other indicates how to calculate the number of work stations. Really, no one will be able to establish the necessary number of work stations if one knows only that this number is determined by the volume of mail processed.

It is not entirely comprehensible to the reader what the authors have in mind when they speak of OPP's of "higher classes," of "first registers," or "large units" (pp. 78-82). Very specific recommendations are given here for the procedure in handling mail, but what units may be considered "large," what classes can be considered "higher,"

and how many registers can be considered "first"? These things should be discussed with greater clarity.

Finally, an extremely serious shortcoming of this textbook is the fact that its pages advocate breaking the rules of safety. The picture on page 139, which depicts parcel post being loaded onto a railway postal car, arouses irritation and astonishment. The packages on the cart are piled high above the sides. When such a cart full of packages moves, some packages will inevitably fall, perhaps leading to accidents. Furthermore, we know from our practice that most of the accidents that occur in mail transportation divisions originate in the transportation of parcel post in carts. The female worker who is loading packages into the car stands in such a way that she could fall under the wheels with the slightest jolt of the locomotive.

Despite all the shortcomings that we have noted, the book is a useful contribution to the literature of the postal system, and its publication has been greeted with satisfaction by workers engaged in the transportation of the nation's mail.

Yu.N. KASPEROVICH, Director of the Postal Division of the Ul'yanovsk Regional Communications Administration

ALEKSANDR FELIKSOVICH GAVRILOV

(On the Occasion of His Seventieth Birthday and the 45-th Anniversary of His Scientific and Pedagogical Activity)

The faculty and student body of the M.A Bonch-Bruevich Communications Electrical Engineering Institute of Leningrad, together with a number of other scientific and educational institutions of this city, have observed the 70-th birthday and the 45-th anniversary of the scientific and pedagogical activity of Professor Aleksandr Feliksovich Gavrilov, the prominent academic mathematician and teacher, one of the founders of the institute.

A.F. Gavrilov was born in 1887. In 1912, he completed the course in physical mathematics at the University of St. Petersburg with a first-degree diploma. Upon the recommendation of Academician V.A. Steklov, he remained at the University for training toward a professorial career. In 1919, A F. Gavrilov was selected to be Professor and Pro-rector for Academic Affairs of the Nizhegorodskiy University.

A.F. Gavrilov returned to Leningrad in 1920 and began his professorial career in the Leningrad Polytechnical Institute. At the same time, A.F. Gavrilov read lectures at a number of other higher educational institutions in Leningrad.

In 1929, Aleksandr Feliksovich began to read the

course in higher mathematics at the advanced courses for communications engineers; after the transformation of the latter courses in 1930 into the Leningrad Communications Electrical Engineering Institute (LEIS), Professor Gavrilov became chairman of the Department of Mathematics. A.F. Gavrilov has since then worked at the institute without interruption, being one of the most active and respected members of the teaching staff.

During his 45 years of productive scientific and pedagogical activity, Aleksandr Feliksovich has created an excellent school of mathematical education in a number of technical higher institutions of learning. At the LEIS, A.F. Gavrilov has been able to form a solid collective in the Department of Mathematics and to direct the scientific work of the department so as to respond to the needs of communications technology to the highest possible degree.

The scientific and pedagogical activity of A.F. Gavrilov has been combined with considerable public activity.

Forty-five scientific works and text books, devoted to differential geometry, the differential equations of mathematical physics, and to the approximate methods of computation, etc., have issued from the pen of Aleksandr Feliksovich. These works contain, in addition to new scientific results, a large amount of material which is capable of direct application in engineering practice and, in part, in communications technology.

A.F. Govrilov has participated actively in training scientific personnel through the medium of graduate study, by means of consultations and special post-graduate courses.

For his fruitful activity, Aleksandr Feliksovich has been awarded the Order of Lenin, the Order of Labor of the Red Banner, and other medals.

ONE HUNDRED YEARS OF THE RUSSIAN POSTAGE STAMP

Very few readers of the St. Petersburg newspaper, "Severnaya Pchela" ("The Northern Bee") who received the regular issue of 10 December 1857 could have paid attention to the small announcement that the Post Office Department was going to introduce postage stamps in the coming year (1858). And scarcely anyone of the readers of the announcement could have imagined, at that time, to what extent this seemingly insignificant innovation would promote the development of postal communications and improve the conditions under which postal services were performed. Previously, before the introduction of postage stamps, every letter mailed actually had to be carried to the post office, where the officials would weigh the letter and decide the postage to be charged the sender. After stamps were introduced, all these procedures became superfluous, and the process of sending a letter became as simple as could be.

The first Russian postage stamp, a two-colored engraving with a representation of the emblem of the Russian Empire, was issued almost unchanged right up to the Great October Socialist Revolution. This situation is not astonishing, in as much as the prerevolutionary Russian postage stamp was simply an ordinary symbol that the charge for sending a piece of mail had been paid.

In our times, the Soviet era, postage stamps have retained their original purpose but have been transformed at the same time, into distinctive miniature posters that reflect the entire diversity of the life of Soviet society. Postage stamps issued in the Soviet Union by the millions have depicted great artists, the most important new projects, monuments of culture, and portraits of outstanding political figures as well as figures in science, literature and the arts.

In examining postage stamps, we are reminded of the most important historical events and memorable dates that are dear to the heart of every Soviet person. Everything to which our people — the creators of a new life — has aspired and aspires has found expression in Soviet postage stamps. The postage stamp has become, in essence, the most massive and most widespread form of artistic typographical production.

The postage stamps of the capitalist countries ordinarily reproduce the portraits of kings, presidents, and other highly-placed individuals. Simple people or people of labor are never depicted on these stamps. The ruling

classes of the capitalist nations earnestly cling to this tradition. It is sufficient to mention, for example, that quite recently – last year – the Ministry of Posts and Telegraph in Great Britian refused to issue a stamp in honor of the great Scottish poet Robert Burns, who was of peasant origin, on the basis that only rulers may be depicted on English postage stamps. We might remark, incidentally, that postage stamps with the image of Robert Burns have been issued in the Soviet Union on a number of occasions in large quantities.

The first Soviet postage stamps, which were issued in August of 1921, shattered this tradition. These stamps were concerned with a theme unusual for postage stamps: the theme of labor. We see on these stamps the emblems of industrial and agricultural production, and also the crossed hammer and sickle, the symbol of the unbreakable fraternal alliance between the working class and the laboring peasantry. On one of these stamps, the artist P. Ksidias has symbolically depicted the liberation of the proletariat from capitalist oppression: a worker, after having broken the shackles of capitalist slavery, stretches out his hands to meet the rising sun.

In 1925, a special series of three stamps was issued to commemorate the 100-th anniversary of the uprising of the Decembrists. One of the stamps contained a picture by the artist D.N. Kardovskiy depicting the appearance of the Decembrists on the Senate Square in St. Petersburg on 14 December 1825; the second stamp contains a picture by A.V. Moravov entitled, "The Decembrists in Chita"; the third stamp contains portraits of P. Pestel', K. Ryleev, S. Murav'ev-Apostol, M. Bestuzhev-Ryumin, and P. Kakhovskiy, who were punished by the imperial government after the uprising was put down. This series of stamps was the first to give a graphic account of the history of the revolutionary movement in our country.

Looking over Soviet postage stamps, we find among them stamps devoted to the first Russian revolution of 1905, the 50-th anniversary of the founding of the Communist Party of the Soviet Union, the 100-th anniversary of the Communist Manifesto, and many other famous historical dates.

Numerous stamps have been concerned with the theme of the Great October Socialist Revolution. One of the most significant is the series issued in honor of the 40-th anniversary of Great October. Each union republic is represented in the series by one stamp, decorated with the national ornament and reflecting the characteristic features of the given republic. For example, the stamp in

honor of the Ukrainian SSR depicts the dam of a hydroelectric power station, a blast furnace, and factory smokestacks, while a steel worker and a collective farm girl stand in the foreground. The stamp issued in honor of the **Armeniann** SSR depicts high-voltage electric transmission powers in the foreground of a mountainous landscape (as is well known, Armenia has far outdistanced Italy, Japan, France, and the Netherlands in the output of electrical energy). Several stamps in this series contained a portrait of V.I. Lenin. One of these depicts the figure of Vladimir Il'ich in the foreground of a red banner; the date "1917-1957" is above, while the inscription "Glory to the Communist Party of the Soviet Union" is below.

The first Soviet postage stamps contain the portrait of V.I. Lenin were issued in 1924, soon after the death of Vladimir Il'ich. Many subsequent postage stamps were devoted to depicting the great leader of the working masses of the whole world in various periods of his activity

Soviet postage stamps also contain the portraits of the founders of scientific Communism, Karl Marx and Friedrich Engels, as well as such outstanding figures in the Communist Party and and Soviet Government as I.V. Stalin, Ya. M. Sverdlov, M.I. Kalinin, F.E. Dzerzhinskiy, V.V. Kuybyshev, and others.

The series of Soviet postage stamps that are devoted to figures in the sciences, literature, and the arts are rich and varied. Together with stamps issued in honor of leading figures in Russian culture, we find stamps containing portraits of the leading representatives of the cultures of other peoples in the Soviet Union and foreig countries.

The achievements of the Soviet people, the builder of Communist society, which are of world historical importance, have found extensive expression in the themes of Soviet postage stamps. Stamps have frequently been issued in honor of the five-year plans for the development of the national economy of the USSR, our individual new projects, and of the opening up of the virgin lands. Two stamps issued at the end of 1957 depicted the first and second artificial earth satellites, the launching of which was an authentic triumph for Soviet science and technology.

A large of group of highly qualified artists is concerned with the production of Soviet postage stamps. Many of these artists have devoted their entire creative life to this work. For example, one of the most prominent

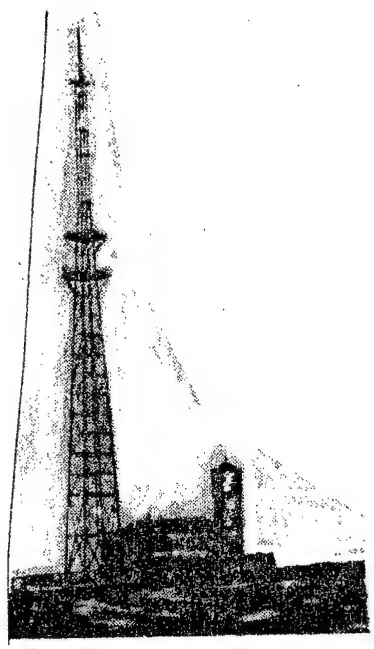
masters of engraving, V.V. Zav'yalov has drawn the originals of more than 500 stamps, while the artist I.I. Dubasov has done more than 300 stamps.

K.F. TAKOYEV

In the illustrations: Several of the postage stamps issued in our country in honor of historical events and significant dates.

EXPANSION OF THE TELEVISION TRANSMISSION NETWORK

The past year of 1957 was distinguished by new achievements in the expansion of the television transmission network of the Soviet Union. More than 10 television centers and powerful television relay stations have been put into operation in Gor'kiy, Vil'nuys, Biysk, Krasnodar, Murmansk, Krasnoyarsk, Novosibirsk, Novgorod, Izhevsk, Yaroslavl', and a number of other cities. In addition, more than 30 low-power relay stations have begun to operate regularly. Thus, the transmission network has significantly increased during the past year in terms of powerful television stations alone. This expansion has permitted a larger section of the country to be served with high-quality television broadcasting, and many hundreds of thousands of workers in the cities and villages have been given the opportunity to view television transmissions on a regular basis.



The transmission station and antenna tower of the Saratov Television Center.

The first stage of the reconstruction of the Moscow

Television Center has been completed. New equipment and studios have been added, with greater opportunity for the capital's television enterprise to offer spectacular presentations.

In addition to the previous two studios, the television center now has available two more studios with areas of 150 and 600 square meters, respectively. Equipment has been installed in the television center for shooting television programs directly from the kinescope onto film tape. As a result, the better television transmission can now be "canned" and the tapes shipped to the television centers in outlying regions for reshowing.

Special radiobroadcasting equipment has also been installed in the television center, permitting the sound track of a television program to be transmitted by radio.

Work will begin in Moscow this year on the construction of a 500-meter tower for the antennas of the television center. The transmission station building will be erected at the foot of the tower to house powerful television and radio ultrashortwave transmitters. When this new transmission equipment is put into operation, the reception zone of Moscow television will be considerably expanded, and image quality will improve.

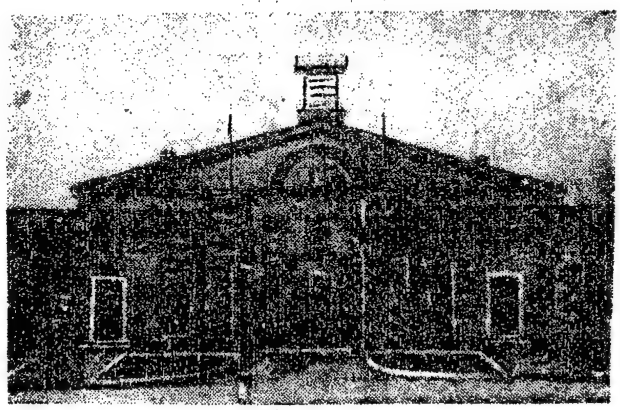
The transmissions of the Moscow television center are already viewed by listeners in Ryazan', Stalinogorsk, Kalinin, Vladimir, Kaluga, and Tula. Radio relay lines will soon link Moscow with many other cities, the inhabitants of which will now have the opportunity to look at the programs of Moscow television on a regular basis.

The construction of a far-flung network of radio relay lines will assist the further rapid development of the network of television transmission stations, and an exchange of television programs among the cities of the nation will become possible to organize.

Among other television centers, the television center of the largest city on the Volga, Saratov, went into operation last year. This television center is the first to be equipped with the new standardized television equipment on four channels.

The construction of the Saratov television center developed rapidly in 1957. The basic work was successfully completed, and the first experimental transmission was sent out, by the time of the 40-th anniversary of Great October. At the end of November, the television center was put into operation formally.

The local Party and Soviet organizations contributed much to the timely completion of the construction of the television center. The workers, students, and pupils of the



The building housing the equipment and studios of the Saratov Television Center.

city took an active part in the construction work, in the laying of cables, in the installation of lines of communication, etc.

The equipment and studios of the television center are located in a beautiful building erected in the center of the city. A high tower with the antennas and the technical building, in which the transmitters are located, is on a hill. Ultrashortwave radio lines carry the programs from the studio equipment to the transmitter building.

The television center began operating only recently, but approximately 8,000 television sets have already been installed in the city and the region. It is curious to note that many television viewers in Kuybyshev, Balashov, and Penza receive the transmission of the Saratov television center regularly and with high image quality.

Price 4 rubles

NEW LITERATURE ON COMMUNICATIONS TOPICS

BABKIN, N.I. The Repair of KVN-49 Television Sets. Second edition. Svyaz'izdat (State Press of Literature on Communications and Radio Problems), Moscow, 1957, 116 pgs. plus 3 inserts. (The Experience of Advanced Communications Workers.) Price 2 rubles 20 kopecks.

The most frequently encountered defects in KVN-type television sets are examined, the book gives instructions on how to detect and eliminate these defects.

VARSHAVSKIY, B., and KISELEV, B. Mobile Communications Branch Offices. Svyaz'izdat, Moscow, 1958, 40 pgs. (The Experience of Advanced Communications Workers.) Price 50 kopecks.

The brochure discusses the work of a number of mobile communications branch offices.

VOROPAY, A.D. The Distribution of the Press in the District. Svyaz'izdat, Moscow, 1957, 39 pgs. (USSR Ministry of Communications. Technical Administration. Lectures for Workers in District Communications Offices.) Price 1 ruble.

The book describes briefly the fundamental operations in the organization of the distribution of periodical publications in district communications offices and village communications branch offices.

GRIGOR'YEV, G.L., and GRUSEVICH, S.I. Full-Automatic Testing Apparatus for Checking the Switches in the Modernized Ten-Step ATS (Dial System). Svyaz'izdat, Moscow, 1957, 51 pgs. (USSR Ministry of Communications. Technical Administration. Lectures in Communications Technology.) Price 1 ruble 50 kopecks.

The lecture examines designs and the operational principle of the full-automatic testing apparatus for checking the switches in the modernized ten-step ATS. The main units of this apparatus, worked out by the NIITS (Scientific-Research Institute of the Telephone System), were constructed with use of electronic devices.

GUBIN, N.M. and SRAPIONOV, O.S. The Organization of Administration in the Communications System. Svyaz'izdat, Moscow, 1957, 44 pgs. (USSR Ministry of Communications. Technical Administration. Lectures for Workers in District Communications Offices.) Price 1 ruble 20 kopecks.

The book reviews the fundamental principles of the organization of administration in the communications system.

NEYMAN, M.S. A Course in Radio Transmitting Equip-

Price 4 rubles

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GRIGOR'YEV, G.L., and GRUSEVICH, S.I. Full-Automatic Testing Apparatus for Checking the Switches in the Modernized Ten-Step ATS (Dial System). Svyaz'izdat, Moscow, 1957, 51 pgs. (USSR Ministry of Communications. Technical Administration. Lectures in Communications Technology.) Price 1 ruble 50 kopecks.

The lecture examines designs and the operational principle of the full-automatic testing apparatus for checking the switches in the modernized ten-step ATS. The main units of this apparatus, worked out by the NIITS (Scientific-Research Institute of the Telephone System), were constructed with use of electronic devices.

GUBIN, N.M. and SRAPIONOV, O.S. The Organization of Administration in the Communications System. Svyaz'izdat, Moscow, 1957, 44 pgs. (USSR Ministry of Communications. Technical Administration. Lectures for Workers in District Communications Offices.) Price 1 ruble 20 kopecks.

The book reviews the fundamental principles of the organization of administration in the communications system.

NEYMAN, M.S. A Course in Radio Transmitting Equip-

ment. Part I. High Frequency Radio Transmitters. "Sovetskoye Radio" ("Soviet Radio") Press, Moscow, 1957, 296 pgs. Price 6 rubles 70 kopecks.

Part I of the book includes sections devoted to the fundamentals of the theory and calculation of high frequency oscillators , oscillation systems, automatic generators, and transmitters with amplitude modulation, as well to questions of design of long-, medium-, and short-wave radio transmitters. The book is intended as a text for radio engineering colleges and faculties.

ORLOVSKIY, Ye.L. The Theoretical Fundamentals of Phototelegraphy. Edited by B.Z. Kisel'gof. Svyaz'izdat, Moscow, 1957, 782 pgs. Price 24 rubles 30 kopecks.

The book offers a theoretical investigation of the processes that occur in phototelegraphy along electric communications lines.

PETROV, A.M., and MOGILEVSKIY, A.YA. Safeguards in the Moscow City Radio Retransmission Network. Svyaz'izdat, Moscow, 1957, 48 pgs. (The Experience of Advanced Communications Workers.) Price 75 kopecks.

The pamphlet discusses the work on safety measures carried out in the Moscow City Radio Retransmission Network

PODZEEV, D.G. SVR Remote Control Equipment. Svyaz'izdat, Moscow, 1957, 48 pgs. (USSR Ministry of Communications. Technical Administration. Lectures for Workers in District Communications Offices) Price 1 ruble 25 kopecks.

The book describes SVR remote control equipment, which ensures the transmission of programs and remote control of the rural wire-broadcast stations from the district center along the district telephone circuits.

POLIVANOV, K.M. Ferromagnets. Fundamentals of the Theory of Technical Application. Gosenergoizdat (State Power Engineering Press), Moscow-Leningrad, 1957, 256 pgs. Price 15 rubles 70 kopecks.

The book gives an account of the scientific fundamentals of the behavior of ferromagnets in electromagnetic circuits of various frequencies. The theory of the skin effect (waves in a ferromagnetic medium) is explained, and the fundamental computational interrelationships are given for magnetic circuits. The book is aimed at engineers and scientific workers.

ROGINSKIY, V.YU. Semiconductor Rectifiers. Second, revised edition. Gosenergoizdat, Moscow-Leningrad, 1957, 96 pgs. (Popular Radio Library. Issue 273.) Price 2 rubles 30 kopecks.

Semiconductor rectifiers are described in this book: selenium rectifiers, copper-oxide rectifiers, germanium rectifiers, and silicon rectifiers. The book examines the

physical processes that occur in semiconductor diodes, the design and properties of these diodes, and the fundamental data concerning the rectifiers of industrial manufacture. The designs most often used for rectifiers and ripple filters are reproduced, and the methods of calculation are described.

RYZHOV, N.V., and BYCHKOV, N.T. Forms and Methods of Disseminating the Advanced Experience of Communications Workers. Svyaz'izdat, Moscow, 1958, 20 pgs. (The Experience of Advanced Communications Workers.) Price 30 kopecks.

The pamphlet acquaints the reader with the most effective methods of disseminating advance work experience as employed in communications enterprises.

The System of Carrier Telephony over Short Distances. "Tekhnika Svyazi za Rubezhom" ("Communications Technology Abroad") Collection of Information. Svyaz'izdat, Moscow, 1957, 123 pgs. plus 1 insert. Price 4 rubles.

This collection describes several systems, worked out abroad over the past few years, of multiplexing overhead and cable communications lines of short length.

SMORCHKOVA, Ye.P. An Analysis of Economic Activity in Communications Enterprises on Independent Financing. Svyaz'izdat, Moscow, 1957, 48 pgs. (USSR Ministry of Communications. Technical Administration. Lectures on Communications Economics.) Price 1 ruble 45 kopecks.

The book discusses the fundamental problems involved in the analysis of the economic activity of communications enterprises that have been transferred to independent financing. The essence and significance of this analysis becomes clear, and the methodology is examined on the basis of the fundamental indexes of economic activity.

SHOLOMOVICH, I.A. Working Capital in Communications Enterprises and How to Accelerate Its Turnover. Second edition. Svyaz'izdat, Moscow, 1957, 48 pgs. (USSR Ministry of Communications, Technical Administration. Lectures on Communications Economics.) Price 1 ruble 60 kopecks.

The second edition of the lecture by I.A. Sholomovich has been revised and supplemented after the death of the author by I.N. Dryakhlov, with due consideration to changes that have taken place in recent years in the practice of working capital planning.

SHTAGER, V.V. The Suppression of Noises in Broadcasting Channels. Svyaz'izdat, Moscow, 1957, 52 pgs. (USSR Ministry of Communications. Technical Administration. Lectures on Communications Technology) Price 1 ruble 55 kopecks.

The book examines the effect of noises and distortions on the quality of transmission in broadcasting channels; it describes the equipment used to suppress these

noises; introduces a theoretical analysis of the work of the electronic compandors and the fundamentals of the calculation of these devices, indicating the possibilities for the application of such devices in various broadcasting channels. In addition to the methods employed for the compensation of nonlinear distortions, a method is described that is based on the utilization of "mutual-inverse" potentiometer circuits.

END

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